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REPORTS OF THE

DEPARTMENT OF THE INTERIOR

FOR THE FISCAL YEAR ENDED JUNE 30

1909

ADMINISTRATIVE REPORTS

IN 2 VOLUMES

VOLUME I

SECRETARY OF THE INTERIOR
BUREAUS, EXCEPT OFFICE OF INDIAN AFFAIRS
ELEEMOSYNARY INSTITUTIONS
NATIONAL PARKS AND RESERVATIONS

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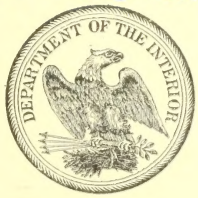

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1910

REPORTS OF THE DEPARTMENT OF THE INTERIOR.

Administrative reports, in 2 volumes.

Vol. I. Secretary of the Interior.
Bureaus, except Office of Indian Affairs.
Eleemosynary institutions.
National parks and reservations.

Vol. II. Indian Affairs.
Territories.

Report of the Commissioner of Education, in 2 volumes.

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REPORT OF THE SECRETARY OF THE INTERIOR.

BUREAUS OF THE INTERIOR DEPARTMENT.

GENERAL LAND OFFICE.

Organized as a bureau of the Treasury Department under act of April 25, 1812 (2 Stat. L., 716).

First Commissioner, Edward Tiffin, of Ohio; appointed May 7, 1812.

Became a bureau of the Interior Department when that department was organized under the act of March 3, 1849 (9 Stat. L., 395).

INDIAN OFFICE.

Organized as a bureau of the War Department under act of July 9, 1832 (4 Stat. L., 564).

First Commissioner, Elbert Herring, of New York; appointed July 10, 1832.

Became a bureau of the Interior Department when that department was organized.

BUREAU OF PENSIONS.

Organized as a bureau of the War Department under act of March 2, 1833 (4 Stat. L., 622).

First Commissioner, James L. Edwards, of Virginia; appointed March 3, 1833.

Became a bureau of the Interior Department when that department was organized.

PATENT OFFICE.

Organized as a bureau of the State Department under act of March 4, 1836 (5 Stat. L., 117).

First Commissioner, Henry S. Ellsworth, of Connecticut; appointed July 4, 1836.

Became a bureau of the Interior Department when that department was organized.

BUREAU OF EDUCATION.

Organized under act of March 2, 1867 (14 Stat. L., 434).

Became a bureau of the Interior Department July 1, 1869, under act of July 20, 1868 (15 Stat. L., 106).

First Commissioner, Henry Barnard, of Connecticut; appointed March 14, 1867.

GEOLOGICAL SURVEY.

Organized as a bureau of the Interior Department under act of March 3, 1879 (20 Stat. L., 394).

First Director, Clarence King, of New York; appointed April 14, 1879.

RECLAMATION SERVICE.

Organized under act of June 17, 1902 (32 Stat. L., 388), under the Director of the Geological Survey, Charles D. Walcott.

First Director, F. H. Newell, of Pennsylvania; appointed March 9, 1907.

REPORT OF THE SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., November 10, 1909.

SIR: I have the honor to submit for your consideration my first annual report of the operations of the Department of the Interior, together with the reports of the bureaus, offices, institutions, and Territories under its supervision.

This report covers a portion of the time under the administration of my predecessor, Mr. Garfield, who, by his earnest and disinterested services, contributed greatly to the advancement of the department in organization and efficiency of administration.

PERSONNEL OF THE DEPARTMENT.

Of a total of 18,916 officers, clerks, and employees of this department, 4,620 are stationed in Washington and the remainder are in the field service. Under my predecessor diligent effort was made to improve the efficiency of this force, by the elimination of incompetent persons and the instillation of a spirit of individual responsibility for the character of the service performed, and this policy is being continued. But no policy within the reach of the Executive can humanely solve the difficulties involved in the discharge of superannuated clerks.

RETIREMENT FUND FOR GOVERNMENT EMPLOYEES.

The Department of the Interior in all of its bureaus in Washington is laboring under a great disadvantage in trying to introduce modern business methods and to keep pace with the increasing volume of work, because of its inability to retire members of the clerical and laboring force after they have become incapacitated by age or other causes. Intermittent efforts have been made to secure congressional aid to retire them upon a basis that will recognize their long service and protect them against want. An involuntary retirement and sustenance statute, by which all persons after arriving at a prescribed age, or for other reasons, should be required to stand an examination before a competent board as to physical and mental ability, with a fund created by national appropriation—in the first instance, and maintained by some equitable system of contribution from salaries—would seem to me to be advisable.

OFFICE OF ASSISTANT ATTORNEY-GENERAL.

The following tabulation sets forth, in a general way, the number of appeals from the Commissioner of the General Land Office, petitions for review of decisions of the department, opinions upon questions submitted by the Secretary's office, appeals from decisions of the Commissioner of Indian Affairs affecting the disposition of Indian lands, proceedings for the disbarment of attorneys and agents, and matters arising under the pension, patent, and other laws, the administration of which is committed to this department, examined by the Assistant Attorney-General and attorneys in his office during the year:

General classification of matters from October 1, 1908, to October 1, 1909.

	Appeals.	Reviews.	Opinions.	Indian.	Disbarment proceedings.	Miscellaneous.
Pending Oct. 1, 1908	353	92	2	80	12	62
Received Oct. 1, 1908, to Oct. 1, 1909	2,276	585	107	1,050	29	708
Disposed of Oct. 1, 1908, to Oct. 1, 1909	2,629	677	109	1,130	41	770
	2,385	641	107	1,080	40	727
Pending Oct. 1, 1909	244	36	2	50	1	43

The work of the office is now practically up to date. The office has also been required to consider and pass upon a vast number of leases of oil and other Indian lands, contracts and other matters incident to the administration of the reclamation act, questions affecting asylums, parks, and other institutions under the jurisdiction of this department, together with recommendations for the institution of appropriate proceedings by the Department of Justice for the recovery of damages arising out of timber and other trespasses upon the public lands, and the cancellation of patents erroneously issued or fraudulently obtained, which matters are too numerous and diverse in character for detailed specification.

The number of certiorari, prohibition, mandamus, and injunction proceedings instituted in the courts of the District of Columbia against officers of the department in connection with the administration of the public-land laws and the distribution of the properties of the Five Civilized Tribes has greatly increased, 83 cases of that character having required attention during the past year, the defense of which has occupied a large amount of time and entailed much labor on the part of the office force.

In the performance of its functions there has been complete cooperation between members of the office force and a most hearty support from the Department of Justice.

PUBLIC LANDS.

The proper use and disposition of the public lands have been questions involving no little legislative as well as administrative difficulty from the beginning of their history. They were, during the earliest administrations, treated as a national asset for the liquidation of the public debt and as a source of reward for our soldiers and sailors. Not until the discovery of gold on the Pacific slope did the policy change for one of exploitation, by which our citizens were encouraged to develop the mineral and agricultural resources of the public domain on condition of receiving limited areas at a nominal cost. For similar reasons, railway and wagon-road grants were liberally donated by Congress in order to add facilities for the opening up of these almost inaccessible regions.

The railway grants generally were limited to nonmineral lands, except such as contained coal and iron, which latter minerals were taken to be essential for railway construction and operation. New States were, when admitted, liberally endowed with public lands for school and other purposes; so that, out of a public domain in 1860 of 1,055,911,288 acres (Alaska then not belonging to the United States), we now have only about 731,354,081 acres, confined largely to the mountain ranges and the arid and semiarid plains, except lands within some of the Indian reservations and the 368,035,975 acres of undisposed of land in Alaska.

All of the principal land statutes were enacted over twenty-five years ago; the homestead act, the preemption and timber-culture act, the coal-land, and the mining acts for the aid of the industrious prospector, were among the earlier acts of this nature.

The liberal and rapid disposition of the public lands under these statutes and the lax methods of administration which for a long time prevailed naturally provoked the feeling that the public domain was legitimate prey for the unscrupulous and that it was no crime to violate or circumvent the land laws. It is to be regretted that we, as a nation, were so tardy to realize the importance of preventing so large a measure of our natural resources passing into the hands of land pirates and speculators, with no view to development looking to the national welfare. It may be safely said that millions of acres of timber and other lands have been unlawfully obtained, and it is also true that actions to recover such lands have in most instances long since been barred by the statute of limitations. The principal awakening to our wasteful course came under your predecessor's administration. The bold and vigorous prosecutions of land frauds, through Secretaries Hitchcock and Garfield, have restored a salutary respect for the law, and the public mind has rapidly grasped the importance of safeguarding the further disposition of our natural resources in the

public lands in the interest of the public good as against private greed. Notwithstanding this, it is necessary to continue with utmost vigor, through all available sources, the securing of information of violations of the public-land laws, and to follow such violations with rigid prosecutions.

In this present policy of conserving the natural resources of the public domain, while development is the keynote, the best thought of the day is not that development shall be by national agencies, but that wise utilization shall be secured through private enterprise under national supervision and control. Therefore, if material progress is to be made in securing the best use of our remaining public lands, Congress must be called upon to enact remedial legislation.

Classification of public lands.—In order that intelligent administration shall be applied in the disposition of the public lands, it is essential that they be classified into various clearly defined divisions according to their principal value or use. They have generally been classified in legislation as agricultural, mineral, desert, timber, and coal lands, and it is only in recent years that the Interior Department, through the Geological Survey, has undertaken to make this classification in the field in the aid of the administration of these public-land statutes, and then only through the general authority given in the organization of this bureau. Specific legislative authority should be given the department to classify and segregate our public lands into well-defined divisions according to their greatest apparent use, with the continuing power of reclassification to meet changing conditions and the increased knowledge of their character which may necessitate the transfer of lands from time to time from one class to the other. Full legal effect should be given such classification when made, so as to prevent entries, under laws applicable to one class, of land belonging to another class, except after application for and a review of the classification; in other words, if lands are classified as coal lands, they should be enterable only as coal lands, and in case it be shown that they are improperly classified as coal lands and are, in fact, agricultural, they should then be enterable only as agricultural lands. This, to my mind, is the only way the Government can scientifically and effectively proceed to conserve the natural resources of the public domain. To leave to the self-interest of applicants the option to claim a particular tract of land as more valuable for mineral, agriculture, timber, phosphate, oil, or gas, or for power sites, is to invite confusion, fraud, and contention, and this has been the source of a major portion of the difficulties of the Interior Department in administering the public domain.

It may seem at the outset that this would be a radical departure, to the extent of suspending the disposition of public lands pending their classification, but, as a matter of fact, a large portion of the undis-

posed-of public lands has already been classified by the department, but such classification has not the authoritative basis or effect to accomplish the result above outlined.

As to minerals, other than those hereinafter specified, because of the manner of their occurrence, doubtless no effective classification can be made in advance of discovery, and they should for that reason be treated as an exception in classification and dealt with accordingly.

As regards new legislation, the present coal-land laws respecting the States and Territories, as well as Alaska, should be supplanted by an act fully meeting existing as well as future conditions. The inducements for much of the crime and fraud, both constructive and actual, committed under the present system can be prevented by *separating the right to mine from the title to the soil.* The surface would thereby be *open to entry under other laws* according to its character and subject to the right to extract the coal. The object to be attained in any such legislation is to conserve the coal deposits as a public utility and to prevent monopoly or extortion in their disposition. This may be accomplished either through a leasing system, by which the title would remain in the Government, under proper regulation and supervision by the Secretary of the Interior, or through the sale of the deposits, and in either case with restrictions on their mining and use which would control the minimum output and conserve the deposits as a public utility. I believe the most advantageous method will be found in a measure authorizing the lease or sale of the *coal deposits in the lands*, subject to forfeiture for failure to exercise the rights granted, under such reasonable regulations as may be imposed. An exploration period of at least one year upon a permit basis, at a nominal charge, would insure to the applicant the necessary preliminary knowledge upon which to make the lease or purchase of the coal deposits and venture the necessary investment for operation. The maximum unit authorized for this use could safely be made from three to five sections, provided no greater surface rights be granted than will give proper facilities to reach and extract the coal deposits.

In case of the failure of the lessees or grantees to open and operate the coal deposits under reasonable limitations and to maintain an output reasonably suited to the deposits, and in case of combinations as to price or limitation of output, title should be forfeited by proceedings in court for that purpose. Government mine supervision would doubtless be necessary to enforce the conditions and limitations under the grant.

The above suggestions with reference to the disposition of coal deposits are equally applicable to the oil and gas fields in the public domain, and similar legislation as to lands containing the same is hereby recommended. Indeed, the very nature of these two impor-

tant mineral resources requires that their disposition be in terms of quantity of the product extracted, rather than of acreage.

Pending the enactment of new legislation as affecting coal lands, all known coal areas were withdrawn from entry for classification and appraisement through the Geological Survey. The following table shows the approximate areas now withdrawn for classification and those classified and restored:

Status of coal-land classification on November 1, 1909.

State.	Withdrawn from coal entry pending examination and classification.	Withdrawn from all entry pending classification—field work completed.	Classified and restored.
	Acres.	*Acres.*	*Acres.*
Wyoming	5,475,990	6,056,656	10,205,803
Washington	2,291,320	.....	612,440
Utah	4,638,080	207,360	1,728,000
Oregon	386,561	.....	885,120
Montana	9,295,360	1,082,880	8,075,300
New Mexico	3,283,420	864,000	5,122,560
Colorado	5,856,320	3,651,680	4,755,120
South Dakota	.....	.....	2,169,917
North Dakota	645,120	.....	2,360,995
Total	31,872,171	11,862,576	35,915,255

April 10, 1909, I changed to a practical and scientific basis the system of classification and valuation for disposition of coal lands under existing laws. For the purposes of classification and valuation, the coal deposits are divided into four classes in accordance with their fuel value and the thickness and depth of the coal beds. The prices of the lands are determined on the basis of an estimated tonnage and range from one-half cent to 3 cents per estimated ton, in accordance with the quality, thickness, and situation of the coal. Provision is also made for taking into consideration in making the valuation any special conditions enhancing the value of the land for coal-mining purposes; also, for a review of the classification or valuation upon proper application and showing to the department.

The following figures show the result of the foregoing system of classification and valuation from April 10 to October 31, inclusive:

	Acres.
Classified as coal land	2,533,562
Classified as noncoal land	10,291,822
Restored without classification	493,003
Total acted on	13,318,387
Sale price of coal land as fixed	$141,890,576
Sale price of same coal land at minimum would be	$47,080,040
Gain in seven months (April 10 to October 1)	$94,810,536

The classification and appraisement of the coal lands in the States and Territories other than Alaska proceed upon the authority of the act of March 2, 1873, which fixes the minimum price only for lands and leaves to the Secretary of the Interior their appraisement and the determination of their maximum value. In view of the fact that the law of Alaska directs the disposition of the coal lands in that Territory at the flat rate of $10 per acre, no such classification or appraisement is warranted by existing law.

Congress has, by the act of February 19, 1909, substantially adopted the recommendations made by me as Commissioner of the General Land Office, in the enactment of a statute, known as the "dry-farming" or "enlarged-homestead" act, authorizing the classification and entry of semiarid lands. The department has, through the Geological Survey, under this act classified 172,097,643 acres, as shown by the following table:

Areas designated under the enlarged-homestead act between March 3 and November 1, 1909.

	Acres.
Arizona	26,657,280
Colorado	20,299,840
Montana	27,954,570
Nevada	49,512,960
New Mexico	15,657,800
Oregon	8,403,200
Utah (secs. 1–5 of act only)	6,731,818
Utah (sec. 6 of act)	1,126,679
Washington	3,608,216
Wyoming	12,145,280
Total	172,097,643

I have also recently withdrawn temporarily, for the purpose of submitting the subject to Congress for new legislation, large areas of oil lands in Wyoming, California, Utah, and Oregon, the area thereof in the several States being as follows:

	Acres.
Wyoming	345,591
California	2,183,022
Utah	1,017,600
Oregon	74,849
Total on November 1, 1909	3,621,062

I desire to call attention to the importance of asking Congress to authorize the Executive to reserve certain areas of these lands for the purpose of affording a supply of fuel oil for the future use of the navy, and to make such regulations as may be necessary for the preservation and extraction of such deposits. No legislation exists for the entry of oil and gas lands, other than the general mining laws of the United States, which are not adaptable to the disposition of lands containing mineral oils and gas.

Under the previous administration, there were temporarily withdrawn, pending action by Congress, 4,702,520 acres of land, in the States of Wyoming, Idaho, and Utah, as containing phosphate deposits. These lands are being reexamined by the Geological Survey at my direction with a view to eliminating all tracts not containing such deposits. The area of the original withdrawals has now been reduced to 4,471,480 acres by the elimination of nonphosphate lands, and I am advised by the classifying officers that additional areas will be eliminated as a result of their examination. The lands containing phosphate are not adaptable to disposition, and should not be allowed to be disposed of, as either placer or lode mineral claims, but the deposits should be leased or sold in limited areas and on conditions preventing monopoly, and insuring domestic use.

The so-called timber and stone acts of June 3, 1878, and August 4, 1902, should be repealed, and a law enacted providing for the disposition of all the remaining timber upon the public lands separately from the soil, and for the disposition of the land after the timber is removed, under appropriate agricultural or mineral laws.

The act of August 18, 1894 (28 Stat., 372, the Carey Act), as amended, should be modified in two important respects.

Under the law as it now stands the reservation of lands applied for by the States and Territories under that act is effective only from the date of filing of map and plan of irrigation. Frequently when the States are engaged in the preliminary work of surveying and the endeavor to ascertain the feasibility of the reclamation of the lands, individual or corporate speculators file or enter upon the lands, thus interfering with or defeating the success of the state reclamation project.

It has also happened in some instances that the States or the contractors who have agreed to engage in the work of reclaiming lands under this act have allowed all or nearly all of the ten-year period of segregation permitted by the act to elapse without engaging in bona fide reclamation work. Such a contingency should be provided against.

I therefore recommend that section 4 of said act be amended so as to authorize the Secretary of the Interior, upon application of the State or Territory, to withdraw areas of public land that appear to be susceptible of reclamation under the Carey Act, pending examination of the lands by the state officials, and the preparation and filing of their map and plan of irrigation if the State determines to attempt the reclamation. Also that a proviso be added to the second paragraph of said section 4 to the effect that unless actual construction of the reclamation works is begun within three years after the segrega-

tion of the lands, the Secretary of the Interior is authorized to declare the annulment of the contract and restore the lands segregated to the public domain.

Unsurveyed railroad lands in national forests.—The approximate aggregate of lands subject to adjustment under the railroad-land grants in national forests, within the primary limits, which are unsurveyed is 6,057,400 acres, as shown by the following table:

	Acres.
Northern Pacific	5,178,420
Southern Pacific	132,800
Central Pacific	58,540
California and Oregon	9,660
Oregon and California	211,780
Atlantic and Pacific (now Santa Fe Pacific)	466,200
Total	6,057,400

These lands can not be surveyed out of the present or general appropriations by Congress for the survey of public lands, as such survey without additional legislation would not give the department authority to reimburse itself out of the lands in case of failure of the private owners to make repayment on demand. There is no incentive for the grantees of these lands to ask for surveys and to make deposits therefor, inasmuch as until surveyed they are not subject to state or other local taxation. This is undoubtedly the main reason for the failure of the railroad companies to expeditiously perfect title. It is also apparent from this state of facts that the small timber-land owner, whose lands are generally surveyed, is placed at a disadvantage, as he has to contribute a larger share of taxation than he would if all such lands were taxed. Estimating the value of these lands at $10 per acre (a conservative average value on timber lands), they are worth $60,574,000, and a tax of one-half of 1 per cent per annum would amount to the sum of $300,000 annually, which should be collectible for the support of state and local government. This is the annual donation given to these great timber-land owners under the present system. The department is interested in having these lands surveyed for another reason, namely, in order that it may speedily complete the adjustment of these land grants.

I therefore recommend that Congress be asked to make an appropriation sufficient to survey these lands, impose a lien upon them for the reimbursement of the cost thereof, and give authority to compel a prompt reimbursement.

Power sites.—In anticipation of new legislation by Congress to prevent the acquisition of power sites on the public domain by private persons or corporations with the view of monopolizing or adversely controlling them against the public interest, there have been tem-

porarily withdrawn from all forms of entry approximately 603,355 acres, covering all locations known to possess power possibilities on unappropriated lands outside of national forests. Without such withdrawals these sites would be enterable under existing laws, and their patenting would leave the General Government powerless to impose any limitations as to their use.

If the Federal Government desires to exercise control or supervision over water-power development on the public domain, it can only do so by limitations imposed upon the disposal of power and reservoir sites upon the public lands, the waters of the streams being subject to state jurisdiction in their appropriation and beneficial use. I would therefore advise that Congress be asked to enact a measure that will authorize the classification of all lands capable of being used for water-power development, and to direct their disposal, through this department, under substantially the following conditions:

1. That the title to such lands be reserved in the Federal Government, and only an easement granted for the purpose of developing and transmitting electrical power for private and public use, and for the storage of waters for power, irrigation, and other uses;

2. That such easement be granted for a limited period, with a maximum of at least thirty years, and the option of renewal for stated periods upon agreed terms;

3. That entry shall be accompanied by plans and specifications covering the works sought to be installed, and covering the maximum horsepower capable of development at such site; also, that a substantial entry fee be paid to show good faith, and that a transfer to the United States of the necessary water rights to permit of the estimated power development be made;

4. That the construction period allowed entrymen for the development of at least 25 per cent of such power shall not extend beyond four years, or such further time as may be granted by the Secretary of the Interior upon a proper showing;

5. That a moderate charge shall be made on the capital invested, or upon the gross earnings of the project for the first ten years of operation, adjusted at each subsequent ten-year period, and equitably determined by appraisement;

6. That all rights and easements shall be forfeitable for failure to make development within the limitations imposed, or upon entry into any contract or combination to charge or fix rates beyond a reasonable profit on the investment and cost of operation, or entry into any agreement or combination to limit the supply of electrical current, or failure to operate the plant; and,

7. That all books and accounts shall always be subject to the inspection of the department.

Unreasonable or narrow restrictions beyond the necessity of public protection against monopoly, or extortion in charges, will, of course, defeat development and serve no useful purpose. The statute should, therefore, while giving full public protection against the abuses of the privileges extended, so far as consistent encourge investment in these projects; and it must always be borne in mind that excessive charges for the franchise will fall upon the consumer. Legislation of this character proceeds upon the theory that Congress can impose such contractual terms and conditions as it sees fit in the sale or use permitted of government lands, so long as such limitations do not conflict with the powers properly exercised by the State wherein they may be situated.

Withdrawal of public lands.—The following table shows withdrawals of public lands for various purposes, the dates of such withdrawals, together with any restorations thereof, and the approximate acreage in each instance. This table does not include lands withdrawn under specific statutory authority.

Withdrawals of public lands.

Withdrawals.			Restorations.		Area remaining withdrawn Nov. 1, 1909.
Date.	Nature.	Area.	Date.	Area.	
		Acres.		*Acres.*	*Acres.*
July 1, 1905, to Nov. 1, 1909.	Coal (for classification), United States, exclusive of Alaska.	79,650,002	To Nov. 1, 1909..	[a] 35,915,255	43,734,747
Nov. 12, 1906.....	Coal (absolute withdrawal), Alaska:				
	Known workable coal...	792,320	.....	.....	792,320
	Coal-bearing rocks	8,092,160	.....	.....	8,092,160
Jan. 7 to Feb. 27, 1909.	Conservation of water resources.	3,673,189	Mar. 30 to Apr. 10, 1909.	[b] 3,673,189	.....
Mar. 2, 1909	Reservoir and power in national forests.	40,000	.....	.....	40,000
June 28, 1906, to Mar. 2, 1909.	Bird reserves (44 in number).	Unknown.	.....	.....	.....
Aug. 21, 1907, to Nov. 1, 1909.	Oil	4,165,542	June 7, 1909.....	[c] 544,480	3,621,062
Dec. 9, 1908	Phosphate.....	4,702,520	To Nov. 1, 1909..	[d] 231,040	4,471,480
Feb. 24, 1909	Winter game refuge.....	138,240	.....	.....	138,240
	Forest administrative sites:				
Aug. 23, 1906, to Feb. 24, 1909.	Outside national forests .	19,974	.....	.....	19,974
Do.....	Within national forests .	601,904	.....	.....	601,904
May 4 to Nov. 1, 1909.	Power sites	603,355	.....	.....	603,355
Total remaining area withdrawn November 1, 1909					62,115,242

[a] Classified.
[b] 421,129 acres are covered by present "power site" withdrawals; the remaining area contains no sites.
[c] Classified, and restored as not containing oil.
[d] Classified, and restored as not containing phosphate.

As the legal authority of the Secretary of the Interior to make even temporary withdrawals of public lands for the purpose of submitting to Congress what may appear to the Secretary as an exigency requiring new legislation applicable to their proper use and disposition has been questioned, it is recommended that Congress give specific authority to make temporary withdrawals of public lands in such cases.

GENERAL LAND OFFICE.

The area of public lands included in original entries and filings during the fiscal year 1909 was 19,982,503.76 acres, which was an increase of 802,146.98 acres over the area entered during the year 1908. The area patented was 13,072,377.54 acres, of which amount more than one-half was disposed of under the homestead law.

The total cash receipts from the sales of the public lands, including fees and commissions, were $9,235,227.70. In addition thereto there were received from the sales of Indian lands $2,651,051.08; reclamation water-right charges, $159,490.93; amounts recovered for depredations on public lands, sales of property and copies of records, $170,645.68, making the total cash receipts from all sources in connection with the public lands, $12,216,415.39—the largest amount received during any fiscal year, except the year 1908.

The excess of receipts over all expenditures and estimated liabilities of the public-land service is $9,494,925.40.

The appropriation of $1,000,000 for the protection of public lands, timber, etc., became available March 4, 1909, and I directed the Commissioner of the General Land Office to make every possible effort to expedite the work to be carried on under said appropriation and to secure prompt action upon pending cases. As a result of investigation by the field force, 1,282,201.1 acres have been restored to the public domain during the past year, an increase of 135,660 acres over the preceding year; $103,444.26 have been collected and turned in to the Treasury as a result of the work of this force, an increase of $304,755.95 (308 per cent) over the amount collected from the same source last year.

During the year 12,397 entries were examined in the field and 5,308 reported upon unfavorably; 7,089 entries have been reported upon favorably; 241 civil suits were gained and 35 lost, and 115 convictions secured in criminal cases.

GEOLOGICAL SURVEY.

The appropriation for the work of the survey for the fiscal year aggregated $1,590,680. While the work of the bureau was hampered by the fact that this appropriation is not large enough to carry out as fully as is desirable the varied lines of investigation and research,

material and important results have been obtained in aid of the administration of the department and for the information of the general public.

This is especially notable with reference to public lands, in which connection, through cooperation with the General Land Office, great progress has been made along the lines of better care and conservation, and proper disposition, of the lands under existing laws. A land classification board has been organized to establish and maintain a uniform standard of classification. Under this organization the classification of coal lands has been continued with important results set forth in another portion of this report. Nonirrigable lands have been classified and made available to entry under the terms of the enlarged-homestead act. The classification work in the western oil fields has aided in the conservation of this important resource and afforded material advantage to those engaged in the oil industry. The examination and classification of phosphate lands have substantially progressed.

An important item in the work of the survey during the preceding year has been the utilization of data already on hand and securing further information with reference to the water-power resources remaining in the undisposed-of public lands.

The geologic, topographic, water-resources, and technologic branches of the survey have cooperated in the work of classification, valuation, and designation of lands and resources, with the result of combining in each instance all available information upon the subjects under consideration.

Geologic branch.—Geologic surveys and investigations were continued during the year in 39 States and Territories, and over 55 per cent of the appropriation for geologic surveys was expended in the 16 public-land States and Territories. In connection with the land-classification work, about 16,000 square miles of supposed coal territory in the Rocky Mountain region was examined. Other work in the public-land States included commencement of the study of the phosphate deposits in Idaho, Wyoming, and Utah, the continuation of systematic, detailed surveys of important mining districts in Colorado, Utah, New Mexico, Arizona, Nevada, and California, and of oil fields in southern California and Colorado and an extension of areal geologic work in these and other States.

General geologic work was continued, one-fifth of the appropriation being devoted to the paleontologic, stratigraphic, glacial, and physiographic investigations which are essential to the advance of the survey's scientific work. Especially notable is the essential connection of the paleontological work with the various problems of economic geology. In the surveys of the oil and coal fields, the tracing of the productive horizons and the correlation of beds from

place to place would be impossible without the assistance of the expert paleontologist.

Under specific appropriation for investigation of the mineral resources of Alaska, geologic and topographic surveys and water resources investigations were continued. Approximately one-fifth of the district has now been covered by reconnaissance surveys, both topographic and geologic, resulting from work beginning in 1898, while areas covered by the detailed surveys consuming a considerable portion of the appropriations since 1903 aggregate less than 1 per cent of Alaska. It appears from the above that it would require, at this rate, at least fifty years to cover the whole district with this preliminary mapping. However, the areas that have been chosen for survey are those of most importance to the mining industry, so that possibly a quarter of the remaining area may not require mapping for many years to come. It is believed that there are about 200,000 square miles in Alaska which should be surveyed at an early date, but under the present appropriation it will be impossible to accomplish this in less than two or three decades and at the same time carry on the detailed work demanded by the mining development.

Along the Pacific seaboard of Alaska the economic exploitation of ore bodies, the installation of fish packeries, and other industries are dependent in a large measure on the utilization of water powers. The scant data at hand indicate that available water powers are fairly abundant, but little information is at hand regarding them.

Cooperation between the divisions of geology and mineral resources was continued and a large proportion of the annual report of mineral statistics was prepared by geologists who have become specialists in various subjects. The effort to expedite the compilation and publication of mineral statistics resulted in the publication during January and February of preliminary statements of the 1908 production with a review of the conditions prevailing during the year, and special bulletins were given to the press on the following subjects: Gold and silver mining in the United States; copper, lead, and zinc production; the cement industry; review of the coal-mining industry; petroleum.

Topographic branch.—Topographic surveys were made in 27 States and Territories, covering 23,831 square miles. Of this amount 15,880 square miles, or more than 66 per cent, were surveyed in the public-land States. In addition, 11,200 square miles of revision or resurvey were completed, making the total area of actual surveys for the season 35,031 square miles. Under a final special appropriation of $10,000, providing for surveys and plans for drainage of the ceded Chippewa Indian lands in Minnesota, this work was completed, the maps and plans drafted and transmitted with the final report to the Secretary of the Interior for submission to Congress.

The popular appreciation of topographic surveys as evidenced by the steady increase in sales of the survey maps is believed to be indicative of the increased efficiency of the topographers. Other recognition of the high standards attained has come in the calls for the topographers of the survey to take up similar work in other countries. Not only have members of the topographic branch been detailed to work under the international boundary commissions, on the Porto Rico Irrigation Survey, and for the Isthmian Canal Commission, but survey topographers have resigned or taken leave of absence to make topographic surveys in Mexico, Honduras, Peru, Africa, and China. The latest and possibly most notable instance of appreciation of the topographic work of this Government has been the request from the director of the Canadian geological survey for the temporary assignment of one or more of the most experienced topographers to be employed by the Canadian survey in the inauguration of similar topographic work in Canada. One topographer is at present on leave of absence and acting in the capacity of field instructor to several of the Canadian parties.

Water resources branch.—During the year the survey has maintained 347 gauging stations in the United States, well scattered over the country, except in certain low-lying portions. In addition, 128 stations have been maintained in cooperation with the Reclamation Service, 82 stations in cooperation with private parties, and 272 stations in cooperation with various States, or a total of 829 gauging stations.

The general investigation of the water resources of the country has been continued along previous lines. The scope of the investigations has recently proved to be of national significance in two important respects. The first is the necessity for the data gathered in connection with the administration of the enlarged homestead act, passed by the Sixtieth Congress. It is obvious that the proper administration of this act requires at the outset a knowledge of the available water supplies. Without such information the act is practically nonadministrable. The second national feature dependent on these investigations is the temporary withdrawal, under the authority of the President, pending legislative action, of water-power sites along the rivers of the public domain. The extent and value of any water power depend on the amount of water that the stream furnishes. To withdraw from entry power sites on the public domain intelligently would be impossible without definite information, but with the aid of the information which the survey has collected during past years, it has been possible to withdraw a large number of power sites immediately, and many more can be withdrawn in the near future by reason of the fact that partial information is now available that can soon be made practically complete.

Technologic branch.—Technologic work was carried on during the year in fuel investigations, structural material investigations, and mine accidents investigations. The first has included an inquiry concerning the fuels of the public domain and also the fuels for use by the Government. The larger part of the fuel used by the Government, aside from that used on board naval vessels, involving an annual expenditure of more than $5,000,000, is now purchased under specifications prepared by the survey and the coal is sampled and tested by the survey. A like treatment is accorded crude petroleum and other mineral fuels used by the Government. In connection with the building and construction work of the Government, the materials to be used are now being generally tested by the survey. These include materials for more than 300 public buildings in various States and Territories, recently authorized by Congress, involving an expenditure of over $50,000,000. Structural materials for use in the engineering works of the Panama Canal, the Reclamation Service, and several bureaus of the army and the navy are also being examined at the survey testing laboratories. The investigations into the causes of mine explosions have included examinations and analyses of explosives used in coal mining in the United States, examinations into the occurrence of explosive gases and dust and of those mines in which explosions have occurred during the year, examinations of so-called "safety" lamps used in mines and of mine-rescue apparatus. The manufacturers of explosives used in coal mining have voluntarily submitted their explosives for testing by the survey and have withdrawn from the market a number of explosives that failed to pass these tests. They have also made commendable efforts to increase the safety of their explosives even beyond the requirements of these tests and have shown a desire to carry out the wishes of the state inspectors and the recommendations of the federal engineers and chemists connected with these investigations. In view of the fact that more than 85 per cent of the fatalities in our coal mines are due not to explosions but to other though in many cases related causes, it is important that the scope of the investigation be extended to include all conditions which make for greater safety in mining.

Publications.—Survey publications embodying the results of the investigations and surveys serve their purpose only as wise and prompt distribution is secured, and special attention has been given to this phase of administration. In the distribution of reports the increase was nearly 10 per cent over that of the preceding year and the number of volumes distributed equaled the number of copies received from the Public Printer. The whole number of topographic maps distributed exceeded that of 1907–8 by over 25 per cent and the sales of geologic folios and of topographic sheets showed an increase of 25 per cent and 20 per cent, respectively.

RECLAMATION SERVICE.

The act approved June 17, 1902, known as the reclamation act, clothes the Secretary of the Interior with a broad discretion in the construction of irrigation works and the disbursement of the reclamation fund, into which fund had been paid, up to and including June 30, 1908, the total sum of $50,661,549.27, and the net investments from which in reclamation works on June 30, 1909, amounted to the sum of $45,757,918.94. The cash receipts from water-right charges to June 30, 1909, were: Building charges, $299,841.22; operation and maintenance charges, $70,825.88, total, $370,667.10. Because of the magnitude of the work and the desirability of making plans far in advance, it has been found necessary to make estimates of the amounts that will become available before the actual receipts can be known. The estimated total receipts in the fund to June 30, 1909, are $58,582,140.66. Upon this basis, and estimated receipts which will become available before December 31, 1910, $5,528,050 have been allotted for reclamation purposes to December 31, 1910.

The discretion imposed by the act also carries with it commensurate responsibilities and obligations, which my predecessors have carried out with the utmost fidelity to the public good.

Some of the most important elements of conservation of the natural resources of the public domain lie within the purview of this statute; the dormant power of stream and flood being conserved for the transformation of the desert into vast tillable areas.

As the law fixes the responsibility for the success of these investments peculiarly upon the Secretary of the Interior, I have felt it incumbent upon me to visit during the last four months as many of the government undertakings as possible, and to determine upon the ground what, if any, changes in administration were demanded to secure the highest results, and, also, to learn the views and the needs of the settlers who are ultimately to pay for these works.

The Reclamation Service has been subjected to much unjust and to some just criticism. The work in the earlier stages of its existence being of a pioneer or experimental nature, room was left for the imagination of the unfair or uninformed critic. Generally speaking, the character of construction of dams, gates, drops, canals, etc., has been of a high type of modern practical utility. The precaution and pains exercised in giving extraordinary strength and durability to structures and to uniformity in canals and ditches has led some to claim that an unfair burden is thereby imposed upon the lands irrigated, without a resultant benefit. Whatever merit there may be in this contention will doubtless not exist in the future work of the service.

The department has been unfortunate in the selection of some projects, considering water supply, soil, and climatic conditions, and in some instances, projects having practically no public lands have

been undertaken, which are within the domain of private enterprise rather than that of the Government.

I wish to assert my disapproval of irrigation projects undertaken by the Government where irrigation is to be accomplished by pumping with steam plants at high lifts, since the burden of operation and maintenance is usually too great for the average farmer. The time may come when such methods may be feasible.

Upon several of the projects the work is of a stupendous character, involving engineering skill of a high order and large initial expenditures, as, for instance, the Roosevelt and Shoshone dams and the Gunnison Tunnel. In so far as any of the projects have been completed, with few exceptions they promise great and lasting beneficial results to the settlers. The present period is perhaps the most unfavorable under which to judge the service, as sufficient time has not elapsed to fully demonstrate results to be accomplished.

The allotments for the year ending December 31, 1910, for the various projects are as follows:

Allotments for reclamation projects for year ending December 31, 1910.

State.	Project.	Allotment.
Arizona	Salt River	$520,000
Arizona-California	Colorado River	
Do	Yuma	110,000
California	Orland	50,000
Colorado	Grand Valley	
Do	Uncompahgre	350,000
Idaho	Minidoka	454,750
Do	Payette-Boise	455,000
Do	Snake River Storage	60,000
Kansas	Garden City	27,000
Montana	Huntley	40,000
Do	Milk River	103,000
Do	St. Mary	12,000
Do	Sun River	82,000
Montana-North Dakota	Lower Yellowstone	110,000
Nebraska-Wyoming	North Platte	515,000
Nevada	Truckee-Carson	86,300
New Mexico	Carlsbad	17,400
Do	Hondo	6,000
New Mexico-Texas	Rio Grande	25,000
North Dakota	Buford-Trenton	20,000
Do	Williston	40,000
Oregon	Umatilla	25,000
Oregon-California	Klamath	293,000
South Dakota	Bellefourche	314,600
Utah	Strawberry Valley	200,000
Washington	Okanogan	12,000
Do	Yakima	1,350,000
Wyoming	Shoshone	150,000
	General expenses	100,000
		5,528,050

The aggregate of these allotments is all the available moneys, except moneys payable from installments of construction, operation, and maintenance charges. The receipts from this latter source do not give encouragement that the fund will be sufficiently replenished to enable an expeditious completion and extension of existing projects or to take up any new work. I am not in favor of the extension of the time of these payments, as eleven years (which the law practically gives) without interest, in ten annual installments, ought to permit any prudent man to meet his payments, unless the cost of construction is a greater burden than the lands will naturally sustain. Forbearance in enforcing payments may be necessary in individual cases, where misfortune which could not be reasonably anticipated has overtaken the settler, as, for instance, sickness or the destruction of crops by the elements, etc.

In view of the importance of a speedy completion of existing projects and their proper extension, and of the necessity in 1912 of an adjustment between the States by which the major portion of the funds arising from the sale of public lands within each State and Territory shall have been expended as far as practicable within such State or Territory, and in view of the importance of making a beneficial use of waters already appropriated or capable of appropriation to which rights may be lost for nonuse, I believe an urgent appeal should be made to Congress to authorize the issuance of certificates of indebtedness, or of bonds against the reclamation fund, to an aggregate of not exceeding $30,000,000, or so much thereof as may be needed. These certificates or bonds should be sold by the Treasurer of the United States from time to time as may be required by the Secretary of the Interior and the proceeds placed to the credit of the fund. They should be redeemable on call within a period of not exceeding ten years after issuance. The proceeds should be devoted to the completion of feasible existing projects and the construction of any feasible extensions thereof, and so much thereof as may be needed should be devoted to the construction of new projects in the States and Territories in which the expenditures have not met the requirements of section 9 of the act of June 17, 1902. This is a reaffirmance of my recommendation to you from the field August 2, 1909.

In addition to the foregoing recommendation, I would advise that an amendment to section 3 of the act be made to authorize the Secretary of the Interior, in his discretion, to temporarily withdraw from all entry not only lands required for irrigation works, but lands believed to be susceptible of irrigation, pending the establishment of farm units and the construction of works to furnish water to the lands;

An amendment to authorize the Secretary of the Interior to withdraw lands within projects for temporary use as experimental farms,

and to construct the necessary buildings thereon, to be paid for out of the reclamation fund;

An amendment to permit the assignment of homestead entries, within projects, after entrymen have completed five years' residence and cultivation and made proof thereof;

An amendment to section 5 to permit the sale of water for lands in private ownership, even though the landowner is not an actual resident in the neighborhood, or, if this be deemed inadvisable, to permit the furnishing of water to nonresident private landowners in all cases where they had title to the land at and prior to the inclusion of the area in the reclamation project; and,

An amendment authorizing the recognition of irrigation district organizations incorporated under state laws prior to the turning over of the project or any portion thereof.

The following table contains a summary of results of the reclamation work from June 30, 1903, to June 30, 1909:

Summary of results of reclamation work, June 30, 1903, to June 30, 1909.

Number of farms for which water can be supplied		12,198
Area of lands for which water can be supplied	acres	767,958
Number of farms actually irrigated		7,970
Area of lands actually irrigated	acres	424,549
Storage capacity of reservoirs completed	acre-feet	903,300
Canals carrying over 300 second-feet	miles	564
Canals carrying from 50 to 300 second-feet	do	678
Canals carrying less than 50 second-feet	do	2,973
Number of tunnels		62
Aggregate length of tunnels	feet	90,388
Aggregate length of dikes and levees	do	353,404
Canal structures costing over $2,000 each		411
Canal structures costing from $500 to $2,000 each		623
Canal structures costing less than $500 each		9,501
Number of bridges		975
Aggregate length of bridges	feet	25,668
Roads	miles	359
Telephone lines	do	1,174
Number of phones in use		424
Earth excavated	cubic yards	52,121,482
Loose rock excavated	do	4,388,553
Solid rock excavated	do	2,921,428
Riprap	do	313,985
Cement used	barrels	929,351
Concrete	cubic yards	765,897
Cost of lands purchased		$1,761,025

For detailed statements as to expenditures and specific information relative to the various projects, reference is made to the Eighth Annual Report of the Reclamation Service.

INDIAN AFFAIRS.

Because of the congested condition of the old post-office building, in which the General Land Office and the Indian Office were housed, in July of this year I transferred the Indian Office, with its 203 clerks, to the Pension building, where it is now comfortably installed in rooms vacated for that purpose by the Pension Bureau.

An investigation of the field service of the Indian Bureau in the early spring satisfied me that it required a thorough reorganization, and steps have been energetically taken to effect this necessity. In no other public service is it as important to have reliable and faithful field agents and a systematic method of inspection and report as in the Indian Service. The Indian may suffer the impositions and know of the misconduct of his agent without a murmur, where the white man under similar provocation would loudly voice his rights. This diversity of temperament has, in a measure, its foundation in the fact that the Indian's appeals have been too frequently ignored by field agents, especially where the Indian's interest conflicts with the white man's interest. I have no doubt that this unfortunate condition has had a demoralizing effect upon some of the officers of the service. I do not want it understood that the service has no agents or superintendents in the field who are of the high type and character that such a service demands. On the contrary, the faithless and deficient agent is the exception and the department is dispensing with the services of such officers as fast as they can be weeded out.

The most arduous task of the department in this respect is to secure the right kind of agents and superintendents for the meager salaries warranted by the appropriation, which should be increased. A reservation containing several million acres, on which the Government has spent many thousands of dollars in the erection of agency buildings, irrigation works, schools, hospitals, and other improvements, should be in charge of a skillful business manager, and the agricultural supervisors on such reservations should also be skilled agriculturists. The civil-service regulations are not adapted to the securing of thoroughly competent public servants of these classes, as the qualifications outside of civil-service examinations are frequently more important than those determined by such examinations.

Indian schools.—My personal visitation to some of the nonreservation Indian schools convinces me that certain of them should be abolished. It is my purpose to abandon at the end of this school year such of these schools as are not sufficiently promoting the public service, and where retained, in such instances as possible, to concentrate the energies of the department on the development of agricultural and industrial schools in order to give the Indian the means of learning how to support himself by farming and by the exercise of

the simpler trades; and, for the Indian girls, a domestic training in harmony with the station they must naturally fill.

The development of the district or day school should be the ultimate aim of the service; a school similar to the system in white communities throughout the country. It will be necessary to extend the system of day schools, each having its demonstration farm, to maintain instructors in hygiene, domestic science, and farming, and, in general, to guide the individual progress of these people. All governmental effort should be with the aim of fitting the Indian to manage his own affairs, and this is the pronounced policy of the department.

It is not surprising that the Indians have not adopted civilized methods of living as rapidly as might be desired. All the traditions of their ancestors and their inherited instincts tend to a continuation of the tribal life.

Reclamation.—Considerable progress in reclamation has been made on a number of the reservations. The most notable success is shown on the Fort Belknap Reservation in Montana, where about 30,000 acres are irrigated at a cost for construction of $4.61 per acre. Splendid agricultural results have been obtained by the Indian farmers among these Indians. Over 100,000 bushels of grain have been harvested this season.

Some of the other reservations show advancement in the same line, but not to the same extent. It is, however, a mistake, I believe, to construct irrigation works upon Indian reservations beyond the agricultural capacity of the Indians or their willingness to utilize them, so that these works will lie dormant for years and fall into disuse and decay. The works on the Crow Reservation are, to a large extent, an example of this kind, and I fear others have been projected which will result in a like manner unless the Indian is skillfully supervised in agricultural pursuits, and his labor used in the construction of the project, and he is thus encouraged and educated to make a beneficial use thereof, and to understand the importance of its use.

Indian warehouses.—I am strongly in favor of discontinuing the United States Indian warehouses at New York, Chicago, St. Louis, Omaha, and San Francisco as soon as it is possible to clear up the business that will pass through them under the annual-contract system. The Indian Service is purchasing about $2,000,000 worth of supplies each year under a system which is in no wise based on commercial methods, as a result of which there is a lack of competition because Indian business can not be as enticing to manufacturers as commercial business, goods are not being obtained at the best prices, and trade discount is an unknown factor.

In the first instance, goods are bought under the annual-estimate system, which means that a superintendent must submit estimates

from seven months to nineteen months in advance of the time that the goods will be needed. This results in purchasing more goods than is actually needed, because where there is a doubt as to the need, the supplies are asked for and usually bought.

Certified checks to the amount of 5 per cent of the bids are required with all bids submitted; when the award is made the successful bidder is required to enter into a contract and furnish a bond in a sum equal to 50 per cent of the amount of the contract; the total of any item bought is not shipped in bulk, but must be split up and packed with other items for special shipment; a period of from two to six months elapses between the delivery and the payment for the goods. As an illustration, I cite a proposal and contract for goods amounting to $200,000, to show the amount paid by the Indian Service on account of its *methods* in conducting business:

Interest on certified check, $10,000, at 6 per cent for two months	$100
Bond of $100,000, at $1 per thousand (estimated)	100
Interest at 6 per cent on $200,000 for four months on account of delayed settlement	3,000
Total	3,200

This represents a conservative estimate of the increased cost and does not include the extra cost on account of our requirements for packing, nor does it take into consideration the cost of maintaining the warehouses through which nearly all of the goods pass for inspection, and the cost in salaries to maintain a force at Washington to handle the work incident to the annual contracts and the settlement of claims.

It is purposed to develop a system of purchasing through purchasing agents with headquarters in one or more of the large commercial centers, and to make arrangements for the elimination of certified checks, contracts, and bonds, and to provide for the settlement of all bills within discount periods—certainly not exceeding thirty days from delivery.

The cost of inspection (inspectors are now hired at $10 per diem and expenses) will be eliminated, as the goods will be bought principally f. o. b. destination, and inspection made by the superintendent receiving them. At least 50 per cent of the expense of the annual contract work and the handling of claims at Washington will be saved.

Allotments.—It has been expected, by the allotment of lands to the Indians in severalty, to largely solve the Indian problem, the theory being that when an Indian received his allotment he would make his home on it, and become a self-supporting citizen. In a measure this result has been attained and the allottee eliminated from further consideration.

On the other hand, a large proportion of allottees have not become attached to their allotments, but have continued their hereditary

practice of roaming from place to place and securing their livelihood by hunting and fishing. This is partly accounted for on the ground that in the allotting work the personal preferences of the Indians have not heretofore been taken into consideration. At present, the allotting work is being more thoroughly done, and the allotting agents are instructed to consider the individuality and personal preference of each allottee, and to adapt the allotment as nearly as practicable to his needs.

Another reason for many of the Indians not living on their lands is that they have not advanced sufficiently in civilization to abandon their tribal practice of living in a communal manner, and have not adopted the idea of separate ownership in lands. Indians who are allotted lands but fail to live on their allotments can not be treated as beyond further consideration by the department, and it is a far more difficult matter to provide for them after being allotted their lands than before. Prior to allotment they could be cared for on the reservations, but after the surplus lands have been disposed of, there is no place on which to care for them.

The total number of allotments, exclusive of those to the Five Civilized Tribes, made by the Indian Office during the last two years aggregates 42,364. The total number of allotments made prior to that time aggregates but 58,349.

Cooperation with other bureaus.—I wish to commend the various bureaus of the department for their efforts at practical cooperation and the elimination of duplication of work so far as consistent with the law and efficient service. In all cooperation, however, with other bureaus affecting the Indian Office, it is important that the Indian Office retain that jurisdiction and supervision which will at all times safeguard the interests of the Indian as paramount, and of which this service has the superior knowledge.

Certain additional legislation is deemed important for the better administration of Indian affairs, which is chiefly of the following nature:

A law authorizing the Secretary of the Interior to lease, for periods not exceeding three or five years, lands within Indian reservations created for the occupancy of Indians by executive order, valuable for grazing or for business purposes in connection with the development of miscellaneous industries. No such authority exists at present, and a law of this kind would not only result in financial benefit to the Indians, but would permit the department to require the improvement of the lands by the building of fences, and justify lessees in developing water upon the grazing lands.

A law authorizing this department to cut and sell the mature timber on Indian reservations and to authorize, under the supervision of the department, the sale of such timber by Indian allottees. When

the timber has reached its maximum growth, it will necessarily deteriorate thereafter, and should be cut for that reason and to make way for new growth. It would also enable the department to supply the demand for timber from white settlers and business enterprises in the vicinity of reservations and allotments.

FIVE CIVILIZED TRIBES.

The only material change which has occurred during the past year affecting the Five Civilized Tribes has resulted from the act of Congress approved May 27, 1908, which became effective July 27, 1908. Under the provisions of this act all lands of intermarried whites, freedmen and citizens of less than one-half Indian blood, including minors, and the surplus lands allotted to those having one-half or more and less than three-quarters Indian blood, are unrestricted. The homesteads of those enrolled as mixed bloods having one-half or more Indian blood, including minors, and all allotted lands of those enrolled as having three-quarters or more mixed Indian blood, and full bloods, including minors, are not subject to alienation prior to April 26, 1931, except with the approval of the Secretary of the Interior.

Under the provisions of this act restrictions were removed from lands aggregating about 8,000,000 acres. The total number of persons enrolled in the Five Civilized Tribes is 101,474. The lands of only about 30,000 of these are still nonalienable without the approval of the Secretary.

The work of the allotment of the lands of the Five Civilized Tribes is practically complete, although there remains considerable to do incident to field investigation and the location of such Indians as remain unallotted and are unaccounted for, together with surveys which must be made to accurately describe reservations for schools, churches, and cemeteries. Much work will also be required in connection with the appraisement and disposition of the unallotted surplus lands, which will aggregate, including the segregated coal and asphaltum lands of the Choctaw and Chickasaw nations, about three and one-half million acres. I recommend that the Commissioner to the Five Civilized Tribes be continued until June 30, 1911, and that the work then incomplete be turned over to the agent at the Union Agency.

Choctaw and Chickasaw lands.—Of the lands of the Choctaw and Chickasaw nations, comprising 11,660,952.35 acres, 8,267,462.97 acres have been allotted to 37,572 citizens, which leaves from the total enrollment of 37,829 Indians 257 yet to be allotted. Of the remaining area of these tribes, 1,373,324.62 acres are reserved from allotment for a proposed forest reserve, and 507,607.95 acres reserved for coal, asphalt, town sites, railroad rights of way, churches, schools, and cemeteries. This large area, except the small portion for townsites,

etc., with the 1,512,556.81 acres, a portion of which will be allotted to the 257 citizens above mentioned, will have to be disposed of before the completion of the work.

The closing of the allotment work of the Choctaw and Chickasaw nations has been retarded by the so-called Fleming case. This case involved the rights of about 2,500 persons to be enrolled as citizens; it has just been decided by the Supreme Court of the United States adverse to their contention and will therefore no longer be a bar to closing up the work of allotment in this nation.

Cherokee lands.—Of the 4,399,067.73 acres comprising the Cherokee Nation, available for allotment, 4,351,172.02 acres have been allotted to 40,182 citizens, leaving a balance of 47,895.71 acres unallotted, and, considering that practically every acre of this land is unsuitable for allotment, and with 1,623 citizens unallotted, I recommend that necessary legislation be enacted which will admit of the sale of such surplus lands, and that the proceeds arising therefrom be made a part of the tribal moneys to be used in completing allotments by payment of twice the appraised value of an allotment, or $651.20 in lieu of a selection of land, as provided by the act approved April 26, 1906. The allotment work in this nation has also been delayed by litigation of various kinds.

Creek lands.—Of the 3,063,083.08 acres comprising the Creek Nation, available for allotment, 2,994,598.21 acres have been allotted to the 18,716 citizens, leaving a balance of 68,484.87 acres. However, under the Creek agreement, there was an allotment of 160 acres regardless of the appraisement of the land and an equalization was to be made on a valuation of $1,040 to an allotment. To make this equalization, approximately the sum of $6,900,000 will be necessary, while about $3,000,000 is available as tribal funds, which sum will be increased by the sale of the unallotted lands. Under the act of Congress approved March 3, 1909 (35 Stat. L., 791–805), it was provided that $800 should be taken as a basis for the equalization of allotments in this nation. It was further provided that as a condition precedent the Creek national council should pass an act in form, approved by the Secretary of the Interior, discharging the United States from all claim and demand on such account. However, such tribal council by resolution recently rejected such legislation; consequently, before action can be taken to complete allotments to this tribe, this question will have to be settled by legislation.

Seminole lands.—The land of the Seminole Nation, comprising 363,851.67 acres, has been allotted to the 3,124 citizens entitled to participate in the division thereof. There remain 2,606.64 acres of unallotted land in this nation to be disposed of, which, together with the eight 80-acre tracts and the twenty-eight 1-acre school tracts, are now being appraised preliminary to sale under existing law, which will

complete, except as to the distribution of the funds, the allotment work of this nation. No further legislation is needed at this time concerning the Seminole Nation.

Choctaw forest lands.—With the idea of establishing a forest reserve in the Choctaw Nation, a large area was withdrawn from allotment in December, 1906, and has been so held since that time, with some deduction of area, for congressional action. This tract is mountainous and sparsely inhabited, scattered portions of it were allotted and the timber thereon alienable, and it is peculiarly subject to timber depredations. A vigorous prosecution has been inaugurated against these timber trespassers. Fifty-nine indictments have been secured; several actions in replevin have been instituted for lumber taken, and the summary removal of all sawmills and like plants has been directed. The matter is well in hand though it is still necessary to maintain a force of inspectors. Some action should be taken looking to a definite disposition of these lands in the interest of the Choctaw Nation.

Litigation to remove clouds.—On May 27, 1908, Congress appropriated $50,000 to be expended by the Attorney-General to cover the expenses of suits to be brought at the request of the Secretary of the Interior in the eastern district of Oklahoma to remove clouds from the allotted lands, which arose from deeds, contracts, mortgages, and other instruments executed by restricted Indians without the authority of the Secretary of the Interior. Nearly 30,000 suits were brought in the name of the United States. United States Judge Campbell, of the district court, has sustained demurrers to these suits, holding that the United States did not have a sufficient interest, either in the person or the property, to maintain the actions but that they should have been brought in the names of the allottees. Therefore, very little practical result has been accomplished by the suits, although they were apparently necessary and involved a vast amount of work by the Commissioner to the Five Civilized Tribes and his force.

District agents.—After the experience of a year the district agency service, created by the act of May 27, 1908, has proved, beyond question, the wisdom of such legislation.

The most important work of the district agents is the investigation of cases of guardianship which includes the appointment, the dismissal, and examination of the reports of such trustees, and it is probable that, under the last branch of such work, a saving of $300,000 has been made to Indian wards. Another saving has been made through them of not less than $200,000 in the collection of back rentals upon leases.

Other than these duties these agents have heard intruder cases, assisted in the delivery of patents and deeds, located allotments, furnished information to the special assistant to the Attorney-General

engaged in the institution of suits to clear the cloud from the title of Indian lands, and taking applications, and performing the work incident thereto, for the removal of restrictions.

In connection with the work of the district agents, and vitally concerning the welfare of the restricted allottees, is the leasing of lands. Under the present system the lands of full bloods may be leased for one year for grazing purposes and five years for agricultural purposes, without the approval of the Secretary of the Interior; consequently, these persons who are incompetent to dispose of their lands naturally make leases for grossly inadequate considerations and, even after complaint to the district agent or some other authority and formal request of him that the necessary action be taken to secure a cancellation of such lease, the Indian is importuned in one manner or another until he revokes the authority theretofore given, and, consequently, any work which has been begun is a mere waste; second, after the application of an Indian for the removal of restrictions a lease is promptly secured covering the land, consequently there are no purchasers when the same is offered for sale, as possession can not be obtained for a period of five years and thus the land remains restricted at the will of the persons who would resort to such action. I recommend that appropriate legislation be enacted providing that all grazing and agricultural leases executed shall not be valid unless approved by the district agent under rules and regulations promulgated by the department.

Oil.—There were 1,378 mineral leases, practically all of which were for oil and gas, filed with the United States Indian agent during the year, which shows a material decrease compared with previous years, which is accounted for by the removal of restrictions from certain classes of Indian citizens by the act of Congress approved May 27, 1908. These leases are made with individual allottees whose lands are restricted and are not valid until approved by the Secretary of the Interior. Such leases formerly provided a royalty of 10 per cent, but the regulations now provide for a royalty of not less than 12½ per cent and in practically all cases where leases were entered into on a basis of 10 per cent royalty, the same has been increased to 12½ per cent. From the best information obtainable the amount of oil held in storage in the Creek and Cherokee nations on June 30, 1909, was 42,654,403 barrels. There are approximately 7,812 producing oil wells, 600 gas wells, and about 1,000 dry holes in the territory of the Five Civilized Tribes, practically all of the same being in the Creek and Cherokee nations, the drilling of which cost about $20,000,000. The royalty collected by the United States Indian agent on oil and gas was $1,813,460.28 as compared with $1,692,627.55 during the previous year. The royalty so collected is held to the

credit of the individual allottees and paid out to them under regulations by the department.

The pipe lines for transporting oil out of Oklahoma are inadequate to handle the production of oil. One new pipe-line franchise was granted to the Prairie Oil and Gas Company during the summer. This company is actively engaged in building its new line to the Gulf and it ought to afford means of handling a large part of the surplus oil.

The price which the restricted Indian gets for his oil is entirely inadequate compared with prices which obtain in other sections of the country. It is difficult to see an adequate remedy. Practically seven-tenths of the oil field belongs to unrestricted Indians. These Indians make leases which bring them inadequate prices. As long as the producers are able to get cheap leases from the unrestricted Indian, they are not inclined to enter into leases with the restricted Indian when the Government is undertaking to secure a more adequate price. The question is difficult in the extreme. The Government in its supervision over the oil fields is practically in the position of a minority stockholder.

PATENT OFFICE.

There has been, as usual, a marked increase in the volume of business in the Patent Office, particularly in the case of applications for patent for inventions. The number of trade-marks registered was less than during the preceding year.

The total money receipts from all sources were $1,975,919.97; the expenditures, $1,887,443.35, leaving a net surplus of $88,476.62. The total of receipts over the expenditures for maintaining the bureau from 1836 to June 30, 1909, is $7,060,547.

The present force of examiners in the Patent Office has enabled the commissioner to bring up the work so that it is now practically current in nearly all of the examining divisions, but future increases in the volume of business will render additions to the force necessary.

The models of inventions, which had been stored in the basement and on the first floor of the Patent Office building during the last year, have been removed to a fireproof warehouse.

In order to make room for the working force of the office, it was necessary to assign additional rooms, which I did, with the result of inconvenience and overcrowding of the employees of the office of the Secretary. The rapid growth of the Patent Office will inevitably require, in the near future, more space than the building now occupied can afford. The removal of the Patent Office to a new building would enable the Secretary of the Interior to utilize the present building to advantage for his own immediate

force, and for the housing of other bureaus and offices of the department now occupying rented quarters. I accordingly recommend that Congress be asked to appropriate a sufficient fund to obtain a site, and authorize the construction of a suitable building in which ample room can be had to properly transact the present and future business of the Patent Office.

In respect to needed legislation pertaining to patent matters, I refer to and indorse the suggestions of the Commissioner of Patents in his annual report for the year ending June 30, 1909, directing particular attention to the recommendation for the enactment of a law which would eliminate one appeal in the Patent Office, and thus diminish materially the expense and time now required in obtaining a final adjudication.

PENSIONS.

Since the foundation of the Government, there has been disbursed for pensions to soldiers, sailors, and marines, their widows and dependents, the sum of $3,913,082,513.73, of which amount $96,445,444.23 was disbursed prior to June 30, 1865. Since that date, pension disbursements have increased from $15,450,549.88, in 1866, to $161,973,703.77, in 1909, the latter amount being the largest sum ever disbursed for pensions in any one year. This increase in disbursement was principally due to the number of pensioners placed upon the rolls under the act of February 6, 1907, granting pensions of $12, $15, and $20 per month to the survivors of the war with Mexico and the civil war on reaching the ages of 62, 70, and 75 years, respectively.

The last surviving soldier of the Revolutionary war died April 5, 1869, and the last surviving widow of that war died November 11, 1906. The name of one daughter of a soldier of the Revolution, pensioned by special act of Congress, still remains on the roll. The last pensioned soldier of the war of 1812 died May 13, 1905, but the pension rolls still contain the names of 395 widows of soldiers of that war.

Since 1861 there have been granted by special acts of Congress 26,377 pensions and increases of pensions, of which 16,407 were on the rolls at the close of the fiscal year, with an annual value of $4,846,126, a little more than one-half of which amount is in excess of what could have been granted under the general laws. The number of special acts granting pensions and increases, passed during the second session of the Sixtieth Congress, was 3,021. The increase in the annual expenditures resulting from those special acts was $454,722.

The number of pensioners on the roll at the beginning of the year was 951,687, to which was added during the year a total of 46,088; 51,581 names were dropped from the roll during the year, because of death and other reasons, leaving the total number, 946,194 at the close of the fiscal year 1909, a net decrease of 5,493.

APPEALS IN PENSION AND BOUNTY LAND CLAIMS.

During the year ending June 30, 1909, 6,013 appeals and motions were received, making the total of cases pending and filed 6,520. During the year there were disposed of 5,864 cases, leaving 656 undisposed of at the close of the fiscal year. The work in this branch of the department has steadily progressed and may be said to be practically current.

BUREAU OF EDUCATION.

In July, 1909, I caused this bureau to be removed from the rented building which it had occupied during the past thirty-five years to more commodious and comfortable quarters in the building formerly occupied by the Post-Office Department, now occupied in part by the General Land Office. The removal has added largely to the efficiency of the administration of the office and to protection of the library from fire, and will effect an annual saving to the Government of $4,623.20 in rent and expenses of heating and lighting.

A complete inventory of the bound volumes in the library has been made. The number of bound volumes therein is 47,230, and the unbound materials, pamphlets, and publications number about 80,000. The systematic recording of accessions to the library has been put into effect, and in future more exact account may be kept of the contents of the collection than was possible in the past.

Each of the 50 States and Territories supporting colleges of agriculture and mechanic arts has received, for the year ending June 30, 1910, $40,000, making the total amount paid out under the acts of Congress approved August 30, 1890, and March 4, 1907, for the support and endowment of such institutions, $2,000,000.

Sixty-nine United States public schools for natives of Alaska were maintained during the year ending June 30, 1909, with an enrollment of 3,809 and an average attendance of 1,521. Instruction in sewing, cooking, and carpentry has been generally introduced into these schools, and an effort is being made on the part of the bureau to introduce sanitary methods of living in the native villages. A law conferring upon the Secretary of the Interior authority to frame a sanitary code for the natives and making failure to comply with its provisions a misdemeanor, would aid teachers and physicians of the bureau in enforcing obedience to sanitary instructions. The amount expended from the fund for education of natives in Alaska during the year 1909 was $200,000.

Eight new reindeer herds were established during the year, making the total number of herds in Alaska 31. It is estimated that there should now be in Alaska a total of about 23,000 reindeer, and there is every indication that the policy of distributing the reindeer among the natives is proving successful and beneficial.

PRINTING AND PUBLICATIONS.

In compliance with the provisions of sections 681 and 683, Revised Statutes, and the acts of February 12, 1889 (25 Stat., 661), and July 1, 1902 (32 Stat., 630), 2,273 volumes of the United States Reports, 1 volume of the Lawyers' Cooperative Publishing Company's Digest, and 15 sets of the reports published by the Lawyers' Cooperative Publishing Company were received by the department and distributed to executive and judicial officers of the Government.

As provided in section 5 of the act of July 1, 1902 (26 Stat., 630), 80 sets of Revised Statutes of the United States and Supplements were distributed to Senators and Representatives.

TERRITORIES.

For the purpose of centralizing information regarding the Territories, and, in so far as the law permits, to place their administration under the Department of the Interior, an order was issued by the President May 11, 1907, and subsequently amended to read as follows:

It is hereby ordered that on and after May 1, 1909, all official communications or reports from and to executive officers of the Territories and territorial possessions of the United States, viz, Arizona, Hawaii, New Mexico, Porto Rico, Alaska, Samoa, and Guam, and all official communications or reports relating to territorial matters from and to all executive officers of the United States stationed in such Territories and territorial possessions, shall be transmitted directly to the heads of the departments of the Government as provided by law, and in all cases where the acts of Congress do not specifically designate the department to which reports shall be transmitted, the same shall be forwarded to the Secretary of the Interior in such manner and under such regulations as he may prescribe.

ALASKA.

The permanent white population of Alaska is estimated at 33,000, 7,000 white persons employed in the mines, canneries, and in railroad construction, who are transients, and about 35,000 natives.

The total value of merchandise shipped from the United States to Alaska during the fiscal year was $17,186,445, an increase of more than a million dollars over the preceding year. The aggregate value of exports to the United States was $34,335,435.

Gold mining continues to be the most important industry, the value of gold produced during the year 1908 being $19,292,818. The production of copper amounted to $605,267.

Coal is widely distributed throughout the district, but up to the present time practically no production has occurred and no patents for coal lands have been issued.

The next most important industry to mining is the canning of salmon, the exports to the United States for the year being valued at

$9,972,316. The pack during the year was about 2,278,000 cases of 4-dozen 1-pound cans.

The white and mixed-blood schools are, by the terms of the act of January 27, 1905, under the supervision of the governor, and have been successfully administered. The amendment of the act so as to authorize the establishment of schools in districts where there are as many as 15 pupils is desirable, there being ample funds for the purpose. The education of the natives, under the supervision of the Bureau of Education, has received mention in another part of this report.

One hundred and sixty-five miles of wagon roads, 383 miles of sled roads, and 241 miles of trail have been constructed, at an approximate cost of $690,000.

The service afforded by the military cable and telegraph is excellent.

The rapid development of the mineral wealth of Alaska and the establishment of transportation facilities is attracting and will continue to attract a constantly increasing permanent population to the district. This creates an increased demand for agricultural products, which can be met in part by local production provided suitable encouragement is given to the settler to enter, improve, and develop lands suitable for agriculture and grazing. The approximate area of agricultural and grazing lands ranges from 16,700 to 28,000 square miles, and the known coal fields embrace about 12,000 square miles, of which about 7,000 square miles could be covered by a system of surveys planned to include the agricultural and grazing lands mentioned. It is very important, in the interest of agricultural development, that the system of public-land surveys be extended over lands of this character, as, in the absence of such surveys, the present cost of acquiring title under the homestead laws is prohibitive except in the most favored localities.

The lands described are widely distributed over a region containing some 200,000 square miles; the cost of surveys in this field will be large because of the high cost of transportation and the shortness of the open season, and to promote the development and encourage the settlers it is important that results should be obtained at the earliest possible date. Many of the difficulties which would attend the execution of surveys in the manner now in vogue in the United States proper can be avoided by providing for a geodetic control of surveys through triangulation. This will enable the taking up of subdivisional work in the most important areas first, and yet the entire area can be included in one system of surveys. With a slight additional cost the triangulation can be extended into the important mining districts and monuments established to which all private surveys for land may be connected, thus avoiding litigation and con-

fusion in future upon questions relating to boundaries. The geodetic methods of survey have been applied in the subdivisional survey work of various Indian-land surveys during the past twenty years and have worked expeditiously and successfully.

Excessive costs of surveys in this field would render it impossible to make the surveys under the contract system unless the maximum rate now allowed by law is largely increased. Complete topographic surveys should be executed at the same time that the subdivisional work is being carried on, as this can be done most economically in connection with the land surveys and will be of very great value to the agricultural and mining interests. The cost of running base and principal meridian lines is estimated at from $30 to $40 per mile, except in districts along the seaboard, where rugged topography and dense timber may in some instances increase the cost to $100 per mile. It is believed that the subdivisional work can be done at a cost of from $2,500 to $3,000 per township. With an accompanying complete topographic survey the cost would range from $1,000 to $1,800 per township more.

It is estimated that the cost of the first season's work for surveying parties to run out from 800 to 1,000 miles of base and meridan lines and connect them by triangulation with established points would be $100,000. Subdivisional surveys could follow during the next year, when seven or eight surveying parties could be placed in the field, at a total cost of about $100,000. This would enable the work to be kept well abreast with the demands of settlers.

I therefore respectfully recommend that the necessary appropriations be made for the initiation of this most important work, and that the Secretary of the Interior be authorized to carry on these surveys by engineers in his department.

Care of insane.—Under the act of April 28, 1904 (33 Stat., 526), a contract was entered into on January 16, 1905, with the Sanitarium Company, of Mount Tabor, Portland, Oreg., for the care and custody of persons legally adjudged insane in Alaska, at the rate of $348 per annum for each patient. This contract expires January 17, 1910. On October 16, 1909, 124 patients were being treated under this contract.

In pursuance of the act approved February 6, 1909 (35 Stat., 601), and after due advertisement, a further contract was entered into with the Sanitarium Company on April 28, 1909, for the care of the Alaska insane for a period of five years from and after January 16, 1910, at the rate of $330 per annum for each patient, the right being reserved, upon conditions therein set forth, to cancel the contract at the expiration of two years from the date thereof.

In my judgment, provision should be made for the care within Alaska of its insane, and I therefore recommend that an adequate

appropriation be made by Congress for the erection of a suitable hospital for the insane, and for its maintenance, at some convenient point in that district.

ARIZONA.

The present population of the Territory is estimated to be about 200,000, the bulk of the immigration coming from the Eastern and Middle Western States.

The past year has witnessed a substantial increase in the output of the mines and the products of the soil.

The receipts for the year ending June 30, 1909, were $917,490.20, as against $882,827.58 for the preceding year. The expenditures for the year amounted to $980,961.05, leaving a cash balance in the Treasury June 30, 1909, of $376,704.88. The bonded city, county, and territorial debt, segregated June 30, 1909, amounted to $3,098,275.29.

The output of the mines during the year 1908 was the largest in the history of the Territory, there having been produced 289,523,267 pounds of copper, 117,647 ounces of gold, 2,808,450 ounces of silver, 2,928,000 pounds of lead, and 304,000 pounds of zinc.

HAWAII.

This Territory, which consists of eight principal islands having an aggregate area of 6,640 square miles, has an estimated population of 175,000. Of this number about 75,000 are Japanese, 18,000 are Chinese, and 5,000 are Koreans. The Hawaiians and part-Hawaiians number about 35,000. Of the remainder, about 14,000 are Americans, British, or Germans, 23,000 are Portuguese, and 5,000 are Spanish, Porto Ricans, and miscellaneous. The number of Japanese resident in the Territory decreased during the year; the number of Portuguese is increasing. An additional income tax has been imposed, from the proceeds of which several hundred thousand dollars will be available for the encouragement of desirable immigration.

The receipts for the year were $3,051,526.81, an increase of $381,778.49 over the preceding year. The expenditures were $2,934,-984.10, an increase of $117,605.24. The surplus of receipts was $116,542.71. The cash on hand July 1, 1909 (current account), was $453,106.76, and there were outstanding warrants amounting to $170,718.57, leaving the net available cash balance $282,388.19. The bonded debt at the close of the year was $3,959,000, a reduction of $20,000.

The imports amounted to $21,424,980, an increase of $1,439,256. Those from the continental United States amounted to $17,391,406, an increase of $2,088,081. The exports amounted to $40,521,504, a decrease of $1,666,951. Those to the United States amounted to

$40,437,352. The decrease in exports was due largely to delay in harvesting the sugar crop.

The customs receipts, which go to the Federal Treasury, amounted to $1,396,379.91, a decrease of $153,777.41 from the preceding year, but larger than for any year except the last two.

The 1909 crop of sugar is estimated at 530,000 short tons, valued at $40,000,000.

Attention is directed to the importance of amending the land laws of the Territory so as to encourage in every way practicable the disposition of lands in small parcels to actual settlers, and to prevent such lands from falling under the control of associations or corporations.

The through steamers which make Honolulu a port of call are generally in foreign ownership and under the coastwise navigation laws can not transport passengers between the Territory and the mainland. The result is that the present transportation service is inadequate. It is accordingly suggested that said laws be suspended for a limited period as to passenger traffic between Hawaii and the mainland.

NEW MEXICO.

The estimated population of the Territory is now 470,000, an increase of about 20,000 over last year. The additions to the population have been mostly from the Middle, Northern, and Middle-Western States, the foreign immigration being less than 1 per cent.

The finances of the Territory are in good condition, the net bonded indebtedness on May 31, 1909, being $912,420.51; the net receipts for the eleven months ending May 31 were $1,611,159.83, and the expenditures during the same period were $1,083,934.67, leaving a balance on hand, June 1, of $527,225.16. All territorial funds are deposited with approved depositories, are protected by ample bonds, and draw interest at the rate of 3 per cent per annum on daily balances.

The coal mines have produced more coal and coke than in any preceding year, 2,708,624.48 tons having been shipped from the mines, of which 682,772.21 went to the coke ovens and the rest to the market. The total value of the coal and coke was $3,881,508.57. The total number of persons employed in and about the coal mines was 2,231, and the fatalities were reduced from 0.926 per cent of the persons employed, in the preceding year, to 0.556 per cent in the fiscal year ending June 30, 1909.

The total valuation of public-school property exceeds $1,000,000. The total expenditure for school purposes exceeded $600,000. Forty-seven thousand nine hundred and eighty-seven pupils were enrolled in the public schools.

PORTO RICO.

Under date of July 15, 1909, the following order was promulgated by the President:

The following act of Congress approved July 15, 1909, is published for the information of all concerned:

AN ACT To amend an act entitled "An act temporarily to provide revenues and a civil government for Porto Rico, and for other purposes," approved April 12, 1900.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the act entitled "An act temporarily to provide revenues and a civil government for Porto Rico, and for other purposes," approved April 12, 1900, is hereby amended by inserting at the end of section 31 of said act the following additional proviso:

"*And provided further*, That if at the termination of any fiscal year the appropriations necessary for the support of government for the ensuing fiscal year shall not have been made an amount equal to the sums appropriated in the last appropriation bills for such purpose shall be deemed to be appropriated; and until the legislature shall act in such behalf the treasurer may, with the advice of the governor, make the payments necessary for the purposes aforesaid."

SEC. 2. That all reports required by law to be made by the governor or members of the executive council of Porto Rico to any official in the United States shall hereafter be made to an executive department of the Government of the United States to be designated by the President; and the President is hereby authorized to place all matters pertaining to the government of Porto Rico in the jurisdiction of such department.

Under the provisions of section 2 of this act hereafter all reports required by law to be made by the governor or members of the executive council of Porto Rico to any official in the United States will be made to the War Department, and all matters pertaining to the government of Porto Rico are placed in the jurisdiction of that department.

The business of the department pertaining to civil government in Porto Rico is, pursuant to section 87 of the act of July 1, 1902, assigned to the Bureau of Insular Affairs.

This act was passed pursuant to the special message of the President of May 10, 1909.

The reports of the Commissioners of the Interior and Education, which were formerly required by law to be submitted to the Secretary of the Interior, have been transmitted under the foregoing authority to the Secretary of War.

GUAM AND SAMOA.

The naval officers who act as governors of Guam and Samoa, respectively, have submitted their reports to the Secretary of the Navy, as required by law.

NATIONAL PARKS AND RESERVATIONS.

The national parks and reservations under the jurisdiction of the department are as follows:

	Acres.
Yellowstone, in Wyoming, Montana, and Idaho	2,142,720.00
Yosemite, in California	719,622.00
Sequoia, in California	161,597.00
General Grant, in California	2,536.00
Mount Rainier, in Washington	207,360.00
Crater Lake, in Oregon	159,360.00
Wind Cave, South Dakota	10,522.00
Sullys Hill, in North Dakota	780.00
Platt, in Oklahoma	848.22
Casa Grande Ruin, in Arizona	480.00
Mesa Verde, in Colorado	42,376.00
(Five-mile strip for protection of ruins)	175,360.00
Hot Springs Reservation, in Arkansas	911.63

My inspection of the Yellowstone and Yosemite national parks during the past summer convinces me that the Government should adopt a more advanced policy respecting their maintenance, improvement, and operation.

(1) A continued extension of roads, trails, and structures for public travel and convenience are required to enable the tourist to obtain the benefits of the scenic beauties of these natural playgrounds—the most wonderful in the world.

(2) These parks have ceased to be experimental as to the operation of transportation lines, hotels, and other concessions, because of the steady stream of travel frequenting them, and the large profits in most cases should require the devotion of a reasonable share thereof to the maintenance of the parks.

I have therefore determined to impose upon all the concessionaires, so far as existing contracts will permit, a franchise or use tax, based upon their gross earnings, for the enlargement of the maintenance fund, and where new leases are executed, to advance the rental and franchise charge proportionate to the privilege enjoyed. A definite system of accounting and inspection will be installed for the Government's protection in this behalf.

The system of maintaining regular troops in the Yellowstone and Yosemite parks is a highly satisfactory method of patrol. The moral effect and the saving of expense in administration alone justify their assignment.

As to the park roads, I would recommend that future appropriations for their construction and maintenance be given to this department for disbursement rather than to the War Department, thus clothing the Interior Department with their control and supervision.

In the Yosemite National Park special attention is directed to the necessity for the establishment of a permanent water and drainage system to protect the health of the tourists and campers, and those

stationed in the park. A board of government experts should be selected to submit proper plans for solving this pressing problem.

It is also advisable, as this is an "all-year" park, to establish a permanent military post in the park, instead of the temporary camp maintained during the summer months. The satisfactory enforcement of park regulations can be carried out in no other way.

I would also urge that Congress authorize the acquisition of private holdings in this park of both lands and toll roads. The large private fenced areas in which cattle are grazed require constant supervision because of breaches of regulations. The private lands containing merchantable timber, if logged off, would greatly mar the beauty of the park.

None of the hotels or public convenience structures in the park are adequate for the accommodation of the tourists, or are in keeping with the scenic surroundings. They are old frame structures of the "wayside inn" type. I would favor the erection by the Government of a permanent tavern or hotel on the floor of the Yosemite Valley canyon and one at Glacier Point, to be leased for reasonable periods.

The electric plant should be condemned as unsafe and a new one installed.

As above stated, private toll roads should be extinguished, and all roads in the park placed under the control of and maintained by the Government. Extensions of road construction are important to give the public easy access to many of the natural wonders of the Yosemite and its adjacent valleys, such as the Hetch Hetchy, and Grand Canyon of the Tuolumne, and a new road is feasible and most desirable along the south crest of the valley canyon to Glacier Point. I have requested the Director of the Geological Survey and Engineers Hill and Hopson of the Reclamation Service to make report upon several of the features here mentioned, which will be submitted to you when received.

Attention is invited to the reports of the superintendents of these and other national parks.

The Grand Canyon of the Colorado was established as a national monument on January 11, 1908. Its status is not such as would authorize the granting of concessions or of controlling travel and conveniences therefor which its growing importance requires. I would therefore recommend that legislation be had establishing it as a national park.

HOT SPRINGS RESERVATION.

The revenues from all sources for the fiscal year were $34,475, an increase of $6,385 over the preceding year. The total expenditures for salaries, improvements, etc., during the fiscal year 1909 were $19,699.27, a decrease of $1,309.51 from the preceding year. The bal-

ance in the Treasury to the credit of the Hot Springs fund on June 30, 1909, was $28,739.53.

During the year a new cement cooling-tank, with a capacity of 14,600 gallons, was installed in the free bath house, and other minor improvements made. The demand for accommodations at this bath house is steadily increasing and a more modern building with up-to-date bathing arrangements will be needed in the near future. Other improvements upon the reservation, consisting of repairs to roads, retaining walls, etc., have been made.

By the sundry civil act approved March 3, 1901 (31 Stat., 1188), the Secretary of the Interior was directed to determine the value of certain condemned buildings formerly located on the Hot Springs Mountain Reservation, which were destroyed by fire on the night of March 5, 1877, and to pay the amount of claims found due in connection therewith, reporting to Congress his action in the premises. Thirty-two claims have been presented under the act, of which 19 have been allowed aggregating in value $48,257.52; 2 claims have been rejected, and 11 are under consideration.

PRESERVATION OF AMERICAN ANTIQUITIES.

By an act approved June 8, 1906, entitled "An act for the preservation of American antiquities," the President of the United States is authorized, "in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments." Under such authority the President has created the following monuments:

National monuments administered by Interior Department.

Name.	State.	Date.	Area.
			Acres.
Devils Tower	Wyoming	Sept. 24, 1906	1,152
Montezuma Castle	Arizona	Dec. 8, 1906	160
Petrified Forest	do	do	60,776
El Morro	New Mexico	do	160
Chaco Canyon	do	Mar. 11, 1907	20,520
Muir Woods[a]	California	Jan. 9, 1908	295
Lewis and Clark Cavern	Montana	May 11, 1908	160
Tumacacori	Arizona	Sept. 15, 1908	10
Navajo[b]	do	Mar. 28, 1909	[c]600
Mukuntuweap	Utah	July 31, 1909	[d]15,360
Shoshone Cavern	Wyoming	Sept. 21, 1909	210
Natural Bridges	Utah	Sept. 25, 1909	[e]2,420
Gran Quivira	New Mexico	Nov. 1, 1909	160

[a] Donated to the United States.
[b] Within an Indian reservation.
[c] Based upon 15 known ruins, with a reserved area of 40 acres surrounding each ruin. Exterior limits of tract specified in proclamation contain 918,310 acres.
[d] Estimated area.
[e] The second proclamation; the first one, dated April 16, 1908, reserved only 120 acres.

National monuments administered by Department of Agriculture.

Name.	State.	Date.	Area.
			Acres.
Cinder Cone	California	May 6, 1907	5,120
Lassen Peak	do	do	1,280
Gila Cliff Dwellings	New Mexico	Nov. 16, 1907	160
Tonto	Arizona	Dec. 19, 1907	640
Grand Canyon	do	Jan. 11, 1908	818,560
Pinnacles	California	Jan. 16, 1908	2,080
Jewel Cave	South Dakota	Feb. 7, 1908	1,280
Wheeler	Colorado	Dec. 7, 1908	300
Mount Olympus	Washington	Mar. 2, 1909	[a] 610,560
Oregon Caves	Oregon	July 12, 1909	[a] 480

[a] Estimated areas.

Paragraph 3 of the uniform rules and regulations promulgated by the Secretaries of the Interior, Agriculture, and War, under date of December 28, 1906, to carry out the general provisions of the "antiquity" act, reads as follows:

Permits for the excavation of ruins, the excavation of archæological sites, and the gathering of objects of antiquity will be granted, by the respective Secretaries having jurisdiction, to reputable museums, universities, colleges, or other recognized scientific or educational institutions, or to their duly authorized agents.

During the year five permits were granted for examination, excavation, and gathering of specimens in Alaska, on the Navajo Indian Reservation, Ariz., Santa Clara Indian Reservation, N. Mex., the public lands of Southern Utah and Colorado, and the Navajo National Monument, Arizona; two permits were issued for the retention of collections obtained on the public lands without proper authority in advance; and three permits for the gathering of silicified samples of wood from the Petrified Forest National Monument, Arizona. Five applications for the latter purpose were denied.

A number of the largest archæological institutions claim that the uniform regulations should be amended so as to remove certain restrictions which they now regard as oppressive, and these restrictions may account for the limited number of applications received for archæological permits. The matter of revision is now under consideration by the department.

BIRD RESERVES.[a]

Reservations for the protection of native wild birds have been created by executive order, as follows:

Bird reserves created.

Name of reservation.	Date.	Location.	Area.
			Acres.
Pelican Island	Mar. 14, 1903	East Florida coast	5.50
Breton Islands	Oct. 4, 1904	Southeast coast of Louisiana	Unknown.
Stump Lake	Mar. 9, 1905	North Dakota	27.39
Huron Islands	Oct. 10, 1905	Lake Superior, Michigan	Unknown.
Siskiwit Islands	do	do	Unknown.

[a] All under the supervision of the Secretary of Agriculture.

Name of reservation.	Date.	Location.	Area.
			Acres.
Passage Key	Oct. 10, 1905	Tampa Bay, Florida	36.37
Indian Key	Feb. 10, 1906	do	90.00
Tern Islands	Aug. 8, 1907	Mouths of Mississippi River, Louisiana	Unknown.
Shell Keys	Aug. 17, 1907	South Louisiana coast	Unknown.
Three Arch Rocks	Oct. 14, 1907	West Oregon coast	Unknown.
Flattery Rocks	Oct. 23, 1907	West Washington coast	Unknown.
Quillayute Needles	do	do	Unknown.
Copalis Rock	do	do	Unknown.
East Timbalier Island	Dec. 17, 1907	South Louisiana coast	Unknown.
Mosquito Inlet	Feb. 24, 1908	East Florida coast	Unknown.
Tortugas Keys	Apr. 6, 1908	Florida Keys, Florida	Unknown.
Klamath Lake	Aug. 8, 1908	Oregon and California	Unknown.
Key West	do	Florida Keys, Florida	Unknown.
Lake Malheur	Aug. 18, 1908	Oregon	Unknown.
Chase Lake	Aug. 28, 1908	North Dakota	Unknown.
Pine Island	Sept. 15, 1908	West Florida coast	Unknown.
Matlacha Pass	Sept. 26, 1908	do	Unknown.
Palma Sola	do	do	Unknown.
Island Bay	Oct. 23, 1908	Florida	Unknown.
Loch Katrina	Oct. 26, 1908	Wyoming	Unknown.
East Park	Feb. 25, 1909	California	Unknown.
Cold Springs	do	Oregon	Unknown.
Shoshone	do	Wyoming	Unknown.
Pathfinder	do	do	Unknown.
Bellefourche	do	South Dakota	Unknown.
Strawberry Valley	do	Utah	Unknown
Salt River	do	Arizona	Unknown.
Deer Flat	do	Idaho	Unknown.
Minidoka	do	do	Unknown.
Willow Creek	do	Montana	Unknown.
Carlsbad	do	New Mexico	Unknown.
Rio Grande	do	do	Unknown.
Keechelus Lake	do	Washington	Unknown.
Kachess Lake	do	do	Unknown.
Clealum Lake	do	do	Unknown.
Bumping Lake	do	do	Unknown.
Conconully	do	do	Unknown.
Yukon Delta	Feb. 27, 1909	Alaska	Unknown.
Bering Sea	do	do	Unknown.
Pribilof	do	do	Unknown.
Tuxedni	do	do	Unknown.
St. Lazaria	do	do	Unknown.
Farallon	do	California	Unknown.
Culebra	do	Porto Rico	Unknown.
Hawaiian Islands	Feb. 3, 1909	Hawaii	Unknown.
Bogoslof	Mar. 2, 1909	Alaska	Unknown.

Bird reserves enlarged.

Pelican Island	Jan. 26, 1909	Florida	Unknown.
Mosquito Inlet	Apr. 2, 1909	do	Unknown.

ELEEMOSYNARY INSTITUTIONS.

GOVERNMENT HOSPITAL FOR THE INSANE.

On June 30, 1908, there were 2,733 patients in the hospital, and during the year ending June 30, 1909, 691 were admitted, making the total number under treatment during the year 3,424. The number of persons discharged, including deaths, was 572. The average daily population was 2,801.66, an increase over the preceding year of 136.96 persons. Of the patients admitted during the year, 187 were from the army, 97 from the navy, 6 from the Public Health and Marine-Hospital Service, and 401 from civil life.

Numerous repairs and improvements to the buildings and grounds have been made during the year, and work has been commenced upon the consolidated power plant which will supply all of the power and heat for the institution. The male nurses' home and the Oaks building have been remodeled, a new barn constructed, and the amusement hall completed.

Buildings for an epileptic group, a new dairy barn, an entrance and gatehouse at the hospital, and an iron fence along the front of the hospital grounds on the east side of Nichols avenue, and additional lands for hospital purposes are needed.

Twelve nurses were graduated from the training school, of whom 10 were women and 2 were men. It is proposed to improve the training course by incorporating therein more practical instruction.

Work in the psychological, pathological, and histopathological laboratories has been actively prosecuted with marked good results.

FREEDMEN'S HOSPITAL.

Two thousand seven hundred and twenty-one patients were treated in this institution during the year, of whom 1,836 were residents of the District of Columbia and 885 admitted from various States. Two thousand five hundred and ninety-two were discharged, of whom 1,288 recovered, 915 were improved, 121 were unimproved, 7 were not treated, and 261 died. The number of patients remaining in the hospital at the close of the year was 129. Of the deaths reported, 57 were in cases which were beyond human aid when received. In the outpatient department 3,358 persons were treated. Eight hundred and seventy-seven surgical operations were performed, a larger proportion, than ever before, being of a major nature.

The bills rendered for the care and treatment of patients admitted from the District of Columbia amounted to $38,846.40, or $13,346.40 more than the appropriation made by Congress for this purpose. Future estimates for payments to the hospital for the care and treatment of these indigent patients from the District of Columbia should

be based upon the number of such persons treated during the previous year at contract rates.

The demand for admission to the hospital by those who are able and willing to pay for medical and surgical services has been large, and, as the institution is now in position to care for such patients, I recommend that authority be given the Secretary of the Interior to receive and provide for pay-patients at the hospital under appropriate regulations prescribed by him; the moneys received from this source to be annually reported to Congress, used in the administration of the institution, and disbursed in accordance with regulations governing federal appropriations.

Under regulations approved by me May 3, 1909, the clinical material which this institution affords was made available to the medical students of Howard University. While the hospital and university are separate and distinct institutions, they are closely related in the advancement of the interests of the colored race, and the privilege accorded under the regulations is of material aid to the medical department of the university.

The high standard of the work of the Training School for Nurses has been maintained, and the number graduated in 1909 was 14, an increase of 1 over the preceding year.

HOWARD UNIVERSITY.

This institution is supported by appropriations made by Congress and by contributions from societies and individuals. It has 1,205 students enrolled, 103 of whom are from foreign countries. The school of theology is supported independently of government appropriations, and is undenominational in character. The school of medicine takes high rank, and, because of its close connection with the Freedmen's Hospital, affords ample clinical facilities for the study of diseases of the colored race.

There was received for the support of the institution during the fiscal year from all sources $160,972.52, including $63,081.32 from the government appropriation; $154,845.04 was expended for the university, leaving on hand an available balance of $6,127.48.

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

The number of students and pupils of all classes in the institution since July 1, 1908, has been 188.

In the collegiate department there were 132 students representing 36 States of the Union, the District of Columbia, Canada, and Scotland. In the primary department there were 35 pupils from the District of Columbia. During the fiscal year 44 students and pupils were discharged by graduation and otherwise. The standards for

admission and graduation have been advanced one year, and important changes have been made in the course of study in the collegiate department.

At the anniversary of the collegiate department in May, 4 candidates were presented for the degree of bachelor of letters; 2 for the degree of bachelor of philosophy; 4 for the degree of bachelor of arts, and 6 for the degree of master of arts.

The total receipts for the institution from all sources amounted to $86,160.45, of which $73,000 was appropriated by Congress for general support; $5,000 for special repairs; $2,500 for improvement and inclosure of grounds, and $5,660.45 was received from private sources for board, tuition, etc. The expenditures for current expenses were $77,821.92, special repairs $5,000, and $2,500 for improvement and inclosure of grounds, leaving an unexpended balance of $838.53.

MARYLAND SCHOOL FOR THE BLIND.

Section 2 of the act of Congress approved May 29, 1858 (11 Stat., 294), authorizes the Secretary of the Interior to place for instruction in an institution for the blind, in the State of Maryland or some other State, the indigent blind children of teachable age who are children of persons actually engaged in the military and naval service of the United States, and under section 4869, Revised Statutes of the United States, the blind children of teachable age belonging to the District of Columbia.

The act of May 26, 1908 (35 Stat., 295), making appropriations for the District of Columbia, provided that after July 1, 1908, a contract should be entered into by the Commissioners of the District of Columbia for the instruction, in Maryland or some other State, of indigent blind children of the District, appropriated $6,000 for the purpose, and repealed the permanent indefinite appropriation under section 3689 of the Revised Statutes. Inasmuch as the Secretary, by section 2 of the act of May 29, 1858 (11 Stat., 293), was also charged with providing for the instruction of the blind children of all persons in the military and naval service of the United States while such persons are actually in such service, the expense to be defrayed from the permanent indefinite appropriation above referred to, the question was submitted to the Comptroller of the Treasury as to whether that appropriation was repealed so far as to be no longer available for the instruction of this class of beneficiaries. In an opinion rendered October 27, 1908, the Comptroller of the Treasury held that the act of May 26, 1908, supra, only repealed the provisions of section 3689 of the Revised Statutes to the extent that said section provides for the education of the blind children of the District of Columbia, and that the permanent indefinite appropriation in question is

still available for instructing the blind children of all persons in the military and naval service of the United States, in some institution in Maryland or some other State, and that the Secretary is authorized to continue to issue permits for the instruction of such children.

No permits for this class of beneficiaries were issued during the past year.

WASHINGTON HOSPITAL FOR FOUNDLINGS.

In pursuance of recommendation made by my predecessor in his report for the year ending June 30, 1908, Congress, by the act of March 3, 1909, placed this institution under the supervision and control of the Commissioners of the District of Columbia.

THE SUPERINTENDENT OF THE UNITED STATES CAPITOL BUILDING AND GROUNDS.

The Senate Office Building was so far completed that on March 5 the building was turned over to the Senate Committee on Rules for the allotment of rooms, and the building was occupied through the extra session of Congress. This building, as well as the House Office Building, will, it is expected, be heated and lighted during the coming winter from the new heating, lighting, and power plant, which plant is also designed to furnish heat, light, and power to the Capitol Building, the Congressional Library, and such other government buildings as may be erected adjacent to the Capitol grounds.

Numerous improvements and repairs have been made during the year at the Capitol, the engine house, Senate and House stables, District of Columbia court-house, Court of Claims building, and Botanic Garden, and work is progressing upon the extension to the building for the District of Columbia court of appeals.

GENERAL EDUCATION BOARD.

This corporation, which was created by act of Congress approved January 12, 1903, has for its object the promotion of education within the United States. The corporation owns no real estate, its property consisting of securities and money divided into various funds according to the purpose for which it is to be used.

The total capital on June 30, 1908, amounted to $38,313,100.29. On June 30, 1909, the general fund amounted to $10,908,355.53, of which $10,845,585.13 was invested in railroad and industrial securities and $62,770.40 was in bank. The principal account of the John D. Rockefeller foundation fund amounted to $10,672,870.02, of which $10,669,697.41 was in securities and the remainder, $3,172.61, in bank. Three special funds amounted, respectively, to $16,955,841.11, $1,037,130.91, and $250,000. The fund of the Rockefeller Institute for Medical Research amounted to $2,621,105, and the balance of principal and income of an annuity fund amounted to $12,260.97.

The expenditures from the various income accounts included administration expenses of $29,486.19, and appropriations for educational institutions, farmers' associations, and for the institute for medical research, amounting in the aggregate to $1,508,888.24.

There is also a special fund known as the "Anna T. Jeanes fund," for negro rural schools, amounting to $200,000. From the income of this fund the sum of $9,367.82 was appropriated during the year.

DISTRICT OF COLUMBIA CORPORATIONS.

The act of May 17, 1862 (12 Stat., 389), required the Washington and Georgetown Railroad Company (Capital Traction Company, successor) to "lay upon the line of its road rails of the most approved pattern, to be determined by the Secretary of the Interior."

The act of Congress approved May 24, 1870 (16 Stat., 136), incorporating the Columbia Railway Company, provided for the submission of yearly reports to Congress or the Secretary of the Interior. The property and franchise of this road have been transferred to the Washington Railway and Electric Company, report by which is submitted directly to Congress.

The act of Congress approved June 23, 1874 (18 Stat., 277), required the Washington Gas-Light Company to annually furnish the Secretary of the Interior with a statement of all its coal contracts or purchases for the ensuing year, excepting the Ritchie mineral and the Richmond coal. The act of March 3, 1903 (32 Stat., 959), provided for the appointment of an inspector of gas and meters by the Commissioners of the District of Columbia. The Washington Gas-Light Company has no connection whatever with this department other than to render the report hereinbefore specified.

In view of the fact that none of the corporations above mentioned are in other respects connected with or under the supervision of the Secretary of the Interior, I renew the recommendation of my predecessor that so much of the several acts as imposed duties upon the Secretary of the Interior be repealed, or so modified as to impose the duties prescribed by the acts upon the Commissioners of the District of Columbia, and to provide that the reports required be made directly to Congress.

MARITIME CANAL COMPANY OF NICARAGUA.

Section 6 of the act of Congress approved February 20, 1889, entitled "An act to incorporate the Maritime Canal Company of Nicaragua," requires said company to report on the first Monday of December in each year to the Secretary of the Interior. The report of this corporation will be submitted to Congress as soon as received.

ALASKA-YUKON-PACIFIC EXPOSITION.

By act approved May 27, 1908, Congress authorized and directed the Secretary of the Interior to aid the people of the District of Alaska and the Territory of Hawaii in providing and maintaining exhibits of the products and resources of those Territories at the exposition. The total appropriation for the Alaska exhibit was $100,000. The appropriation for the Hawaiian exhibit was $25,000, to which the Territory added a like amount.

Section 11 of the same act provided for a government exhibit at the exposition and appropriated $200,000 for the selection, purchase, appropriation, transportation, arrangement, exhibition, and return of the articles exhibited.

Under the provisions of the act, the President appointed a government board of managers, composed of three persons, the Assistant Secretary of the Interior, Hon. Jesse E. Wilson, being designated as chairman of the board.

Creditable exhibits were made for the District of Alaska and for the Territory of Hawaii in buildings erected for that purpose. A large building was erected for the display of the general government exhibit, which was pronounced by competent judges as the best and most interesting exhibit of that character ever displayed by the Government at any exposition.

The various government officers who assisted in collecting, preparing, installing, and maintaining the several exhibits are to be commended for their efficient work. During the entire period covered by the exposition, the officers and members of the Alaska-Yukon-Pacific Exposition Company cooperated in every way with the Government in its work.

Until the work connected with the packing, shipping, and return of the exhibits to their proper places, and the liabilities are all ascertained and accounts adjusted, an exact statement of the status of the various appropriations can not be made. It would appear, however, that all such liabilities and expenses will be well within the funds available. All reports available from the officers of the exposition company indicate a successful financial management.

I respectfully refer to the annual reports of the chiefs of the various bureaus and other officers of this department for detailed information.

Very respectfully,

R. A. BALLINGER,
Secretary.

The PRESIDENT.

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE.

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., October 26, 1909.

SIR: The following report of the work in the General Land Office for the fiscal year ending June 30, 1909, and recommendations for change in legislation are respectfully submitted.

GENERAL STATEMENT.

In addition to the performance of the regular work during the last fiscal year, two very important changes have been inaugurated and nearly brought to perfection—an entirely new method of keeping accounts and a new filing system. In my last report these matters were briefly touched upon as having been started. During the past year they have been perfected.

There is no question concerning the necessity for the new accounting system. The one in vogue prior to July 1, 1908, was imperfect and did not provide the necessary checks. That under which the office is now working provides an absolute check on all moneys taken by the receivers in the 104 local land offices throughout the United States. As an integral part of this most important change it was found advisable to substitute consecutive numbers for all entries instead of adhering to the old system of series of numbers for each class. The second entry in any office is now numbered "2," whether it be the same character as the first or not; heretofore all homestead entries were in consecutive numbers, all desert-land entries in the same way, and similarly all other entries, so that there would be homestead entry No. 1, desert-land entry No. 1, timber-and-stone entry No. 1. Under the present system the desert-land entry, if made after the homestead entry, becomes entry No. 2. The checking of moneys received becomes the easier, and there is no extra work required in securing data as to the different classes of entries.

The new filing system adopted includes flat filing. There is no argument needed to show the greater desirability of this practice over that of folding papers and placing them separately in the jacket.

The files have been centralized and cards are made of every case received, and placed on the desks of the examining clerks instead of the cases themselves, no more of the latter being given to the clerks than are under immediate examination. If the case is held up and additional information called for, the fact is noted on the card and the case returned to the files awaiting the reply. The office by the new system is also enabled to obey the law which calls for an alphabetical index of all patents. This was not heretofore followed. The system is far more orderly, and once mastered will prove more expeditious. It can well be understood, however, that the task of installing it has been a great one. There is also difficulty experienced by many of the older clerks in changing from the old system to the new. A very great majority of the employees of the office are to be congratulated upon the way in which this work has been met and overcome. The work has been a great one, and the office should receive commendation for meeting the emergency in the way in which it has been met. There is no doubt about the necessity for the change; past defalcations in local offices tardily discovered show that the method of accounting was absolutely faulty; an inspection of the old records of cases will show how destructive of old papers the folding system was; the law demanded an index of patents; the carding of the cases meets this; the substitution of a card for the large record has met universal approval whenever it has been tried in the business world. By keeping a card of entry made, it is now possible to prevent a second entry sought to be made by one who has filed a prior application.

A mechanical process of taking certified copies of patents has been adopted, with the resultant saving of the time of five in every seven clerks employed on the work and a greater facility to always keep this branch of the work up to date.

CARE IN EXAMINATION OF TRACT BOOKS.

Greater time is now necessary for the examination in this office of all kinds of applications for lands, owing to the fact that numerous withdrawals, for different purposes, have been made and noted on the tract books. In consequence, before the allowance of any claims the tract books have to be most carefully examined to see that the land applied for is not within one of the reserved areas. This, of course, takes greater time than when the tract books showed no or few withdrawals.

CASH RECEIPTS.

The total cash receipts from the sales of public lands, including fees and commissions on both original and final entries for the fiscal year 1909, were $9,235,227.70.

Miscellaneous receipts: From sales of Indian lands, $2,651,051.08; reclamation water-right charges, $159,490.93; depredations on public

lands, sales of government property, and copies of records and plats, $170,645.68, making the aggregate total of cash receipts of this bureau during the fiscal year 1909, $12,216,415.39, a decrease from the fiscal year 1908 of $499,294.07, although the largest amount received during any fiscal year except 1908.

The total expenses of district land offices for salaries and commissions of registers and receivers, incidental expenses, and expenses of depositing public moneys during the fiscal year ended June 30, 1909, were $844,095.84, an increase of $1,983.39. The aggregate expenditures and estimated liabilities of the public-land service, including expenses of district land offices, were $2,721,489.99, leaving a net surplus in the United States Treasury of $9,494,925.40.

AREA OF LAND ENTERED AND PATENTED.

The total area of land originally entered during the fiscal year 1909 is 19,892,503.76 acres, an increase of 802,146.98 acres as compared with the area entered during the year 1908. The total area upon which final proof was made is 8,171,240.49 acres, an increase from the previous fiscal year of 103,195.64 acres. The area patented during the fiscal year is 12,808,811.084. The past fiscal year was the first year during which a record of the area of lands patented has been kept, therefore no comparison of previous fiscal years can be made. Of this area, 6,534,090.36 acres were patented under the homestead law.

EPOCH OF SALE.

In reviewing the history of public-land legislation and public-land policies there can be found three distinctly marked epochs—the epoch of sale, the epoch of development, and the epoch of reservation. When the United States came into being it was found that the expenses of the war had been such that there was a large debt to be paid; the States were asked to cede to the Central Government their lands, which were to be held as public lands, and which were regarded as an asset for the payment of the debt. This was the era of sale.

EPOCH OF DEVELOPMENT.

The second epoch was started as a natural consequence of the increase in population. The son of the old pioneer sought new lands that he might repeat his father's successes in winning a new country to civilization. Though he committed a wrong in going on the public land of the United States, it was a *malum prohibitum* and not a *malum per se*, and there was no appeal to his conscience to prevent him from going on the vast domain and in endeavoring to win a home. Congress, therefore, was forced to recognize his rights acquired in this manner, but, the idea of sale still predominating, gave him the prior right to buy at a price which seems to have been about the sale price

obtained for lands. From this recognition the step was easy, as the attention of Congress was more strongly called to the necessity of the establishment of homes and the development of the vast western empire; it took but a little time for the proper theory to be appreciated, and the free homes theory became that of the Government, and with it came the epoch of development.

Under this policy the West has been subdued more rapidly than was anticipated. There is no question but that advantage has been taken of the liberality of the laws of the United States and land wrongfully acquired.

The spirit of the extreme is characteristic of this nation. With the idea of quantity came the spirit of waste. The man with the bird's-eye view could see this, but the man on the ground with the endless prairie stretched before him or with the giant forests around him was difficult to convince that the supply had a limitation.

EPOCH OF RESERVATION.

After development came in the last few years the theory of reservation, on the principle that development for the greater good of the nation would eventually be better perfected if present acquisition were checked until the correct lines of travel could be definitely marked out. Many of the resources which in an unoccupied country were useless, in the country as now settled are found to be of great value for future uses. They are of the character which is necessary for the maintenance of human life, furnishing as they do heat, light, and housing for the people. Congress has already passed laws looking to the preservation of the timber supply, but has not as yet enacted adequate legislation covering the coal land and water powers.

CONSERVATION.

I call especial attention to the recommendations made by you as Commissioner of the General Land Office with regard to needed legislation with respect to the timber lands and coal lands of the United States. The recommendations were as as follows:

The timber-land acts above referred to should be repealed and the timber upon the remaining public lands disposed of by the Secretary of the Interior at public sale, upon application therefor, after scaling and appraisal, or upon a stumpage basis similar to the method now exercised by the department in the Chippewa Indian lands. Under such a measure, merchantable timber standing upon public lands not in a national forest may be ordered into market and sold, after due advertisement, to the highest bidder, on condition that the timber shall be removed from the land within a fixed period of years. The method of estimating stumpage and terms of sale and tracts of timber offered, together with other necessary regulations, should be prescribed by the Secretary of the Interior.

I would advise that any such measure should provide that a bona fide applicant to homestead a tract of timber land should have a preference right to purchase at the top price bid, upon payment of a reasonable percentage of the

bid, and under such purchase the timber should not be removed until the entryman has complied with the law as to residence and cultivation and made full payment for the timber, as bid, or has made full payment for the timber.

The present coal-land law should be supplanted by an act fully meeting existing as well as future conditions. The object to be attained in any such legislation is to conserve the coal deposits as a public utility and to prevent monopoly and extortion in their distribution. This may be accomplished either through a leasing system, by which the title would remain in the Government, under proper regulation and supervision by the Secretary of the Interior, or through the sale of the deposits with restrictions on their mining and use which would control the minimum output and conserve the deposits as a public utility, under similar regulations. As regards the future disposition of coal lands, I am impressed with the belief that the most advantageous method will be found in a measure authorizing the sale of the coal deposits in the lands, subject to forfeiture for failure to exercise the rights granted, under such reasonable regulations as may be imposed. An exploration period of one year upon a permit basis, at a nominal charge, would insure to the applicant the necessary preliminary knowledge upon which to make the purchase of the coal deposits and venture the necessary investment for operation purposes before making the cash purchase. The maximum unit authorized for this use could safely be made three sections, provided no greater surface rights are granted than will give proper facilities to reach and extract the coal deposits. The suface would thereby be open to entry under other laws according to its character and subject to the right to extract the coal. In case of failure of the grantees to open and operate the coal deposits under reasonable limitations and to maintain an output reasonably suited to the deposits, and in case of combination as to price or limitation of output, title should be forfeited by proceedings in court for that purpose. Government mine supervisors would be necessary to enforce the conditions and limitations under the grant.

The Secretary of the Interior should be authorized to grant a suspension of operations in any case upon a showing of sufficient cause. If all persons having pending coal claims, declaratory statements, and entries at time of adoption of the proposed law be given the opportunity to consolidate their claims to the extent of not exceeding three sections of contiguous lands and to transmute their filings or entries to purchase of the coal under the new measure, they would be enabled to obtain a sufficient area of coal to warrant their entering upon coal-mining operations without resorting to practices not authorized by existing law.

The method of disposition suggested should be made applicable to coal deposits in all public lands of the United States, permitting, however, in Alaska, as under existing law, the coal applicant to have executed a special survey of the lands within which the coal sought to be purchased lies. This plan, if adopted, will enable the Government to control and dispose of all the surface not needed in coal-mining operations and to dispose of the timber separately from the land, and will permit the sale and extraction of coal both on the unreserved public lands and in national forests without affecting the control or disposition of the timber on the public lands by the Secretary of the Interior, or within national forests by the Department of Agriculture. The above suggestions with reference to the disposition of coal deposits are equally applicable to the oil and gas fields in the public domain, and similar legislation, as applicable to lands containing the same, is hereby recommended.

These recommendations were again brought forward in my report last year, and especially the recommendations with regard to the

disposal of coal lands. I also, in my report, made an added recommendation in regard to irrigable arid lands, in the hope that Congress might pass some legislation under the terms of which these lands could be preserved for the United States, in order that when money was available for their reclamation, they might be opened as public lands, and in this way the greatest amount of homes provided at the least cost for those who desired them.

No general legislation has been enacted covering any of these points.

COAL-LAND LEGISLATION.

Attention is called to this because of the demand for the conservation of the natural resources and because of the entire inadequacy of present legislation either for the conservation or for the proper development of either coal or oil lands. In his message to Congress at the beginning of the first session of the Sixtieth Congress, President Roosevelt indorsed your recommendation in the following words:

> In my judgment the Government should have the right to keep the fee of the coal, oil, and gas fields in its own possession and to lease the rights to develop them under proper regulations; or else, if the Congress will not adopt this method, the coal deposits should be sold under limitations, to conserve them as public utilities, the right to mine coal being separated from the title to the soil.

After this indorsement of your recommendation, President Roosevelt, recognizing the absurdity of present limitation in regard to area, added:

> The regulations should permit coal lands to be worked in sufficient quantity by the several corporations. The present limitations have been absurd, excessive, and serve no useful purpose, and often render it necessary that there should be either fraud or else abandonment of the work of getting out the coal.

The conditions which existed then exist to-day, and the situation which is thus created and which was recognized by President Roosevelt is as intolerable now as it was then.

Any legislation in regard to the disposal of coal lands by lease or otherwise, should contain a strong antitrust clause and a provision which would prevent any agreement to abstain from mining the coal. If it should be determined to lease on a royalty, then unless such a clause be inserted so that open competition may be maintained, the charge of the royalty will mean nothing more than that the public will pay the additional price. This would not in any way relieve the situation.

PRIMARY ASSETS.

As set forth in the citation from your report when Commissioner of the General Land Office, the laws should be so changed as to treat each primary asset in the public lands separately, disposing of the

surface of the land generally, for agricultural and grazing purposes, disposing of the merchantable timber thereon under some equitable arrangement which will permit of its removal without hindering or delaying the agriculturalist. The coal, other fuels and phosphates should be offered upon a sale, lease, or royalty basis, as required for economic uses; the metals and other minerals of uncertain deposition should be left to the free and open exploration of miners and prospectors.

ALASKA COAL LANDS.

At the time of writing this report no patents have been issued on applications under the coal-land laws for coal lands in Alaska. No applications are on file in the Interior Department under the act of May 28, 1908. Thirty-three entries have been made for coal lands and are now pending under the act of June 6, 1900, and the act of April 28, 1904. These applications are under entries made at the Juneau land office at periods from February, 1907, to October, 1907, and have, therefore, been pending for two years or more. These applications are being heard on the allegation that the entrymen had agreed to combine their holdings after patent issued in excess of the amount allowed by law.

The act of June 6, 1900, briefly, extended the public-land laws of the United States, so far as relating to coal lands, to the district of Alaska. It was soon found, however, that this was not applicable, inasmuch as the lands in Alaska were unsurveyed and the coal-land laws of the United States applied to surveyed lands only. The act of April 28, 1904, was passed for the purpose of relieving the situation and to enable applicants to locate coal lands upon unsurveyed lands, and to provide for the survey thereof. The act of May 28, 1908, entitled "An act to encourage the development of coal deposits in the Territory of Alaska," authorized the consolidation of claims into one single claim, location, or purchase, not to exceed 2,560 acres of contiguous land. The authority of consolidation in this manner is limited by the act to those persons who made locations without any understanding between themselves of cooperation, but who, after location and prior to entry in the local land office, agreed to so cooperate. In all cases the location must have been made prior to November 12, 1906, or in accordance with circular of instructions issued by the Secretary of the Interior May 16, 1907.

On November 12, 1906, by order of the Secretary of the Interior the coal lands were withdrawn from further entry, and remain so withdrawn. Every effort is being made to determine the facts in all these Alaska cases.

The fact that 160 acres for an individual and 640 acres for a corporation of coal lands are entirely inadequate to warrant the

expenditure of the sums of money necessary to successfully open up a coal mine has been generally recognized. That which is true in the States is certainly still more true of lands in remote regions like Alaska. This being so, it is hardly probable that any man would take up 160 acres of land in Alaska with the honest purpose of exploiting it himself; if the withdrawal of November 12, 1906, were revoked under present conditions, it is practically certain that lands would be entered for the sole purpose of speculation and for sale to the highest bidder. This would render possible the monopolization of the coal lands through purchase by large syndicates. If intent of development existed, it could only be carried out by the cooperation of the locators and in agreement to combine areas in excess of the amount allowed by the existing law, which would therefore be not permissible.

The act of May 28, 1908, aimed to be liberal in the area to be patented, but by the antimonopoly clause in section 3 stringent in its prevention of the passing of lands into the hands of monopolies. There is no question but that this section has the force which it was intended to have. The act, however, is limited in its authorizing of consolidation, and most careful scrutiny will be passed upon all applications to ascertain whether or not the agreement of consolidation or cooperation was not, tentatively at least, entered into prior to the location of the lands. There is no argument necessary to convince any honest-minded and impartial person of the necessity for coal development in Alaska. The country to-day is looking to Alaska for its greatest production of mineral wealth, and it has always heretofore been accepted as a primary principle that by an increased production of precious metals the wealth of the nation is largely enhanced. It has been the history of this country that the free exploitation of the precious metals is of great benefit. Any attempt to thwart or impede such production would be a national disaster. Hand in hand with this production goes the call for coal, especially in a country in which the climate is so rigid over by far its greatest area. It is to be hoped, therefore, that Congress will take hold of this vexed question and settle once for all in a clear and explicit manner how the development of the Alaska coal fields can be followed in a legal fashion.

Any legislation which provides for a sale or lease of larger areas of the coal lands should contain an antimonopoly clause similar to that enacted by section 3 of the act of May 28, 1908.

POWER OF THE COMMISSIONER.

Congress is under the Constitution given full control over the public domain and its will alone may be consulted in the disposition thereof. It has established the office of Commissioner of the General

Land Office and has provided that under the direction of the Secretary of the Interior the commissioner shall perform all the executive duties appertaining to the survey and sale of the public lands, but it has prescribed the manner in which the survey and sale of the lands shall be conducted and has not empowered either the Secretary or the commissioner to sell or to withhold from disposition public lands except in the manner specifically provided by law.

The statute creating any executive office and defining the duties of the officer by necessary implication restricts the powers of the officer to the performance of the duties prescribed and those reasonably incident thereto. It is not necessary that the legislature should prohibit the assumption of other powers. The inclusion or recitation of specific duties excludes the power or authority to perform others.

In the disposition of the public domain or in withholding it from sale or entry the executive officer clothed with the administration of the public-land law can act only pursuant to the laws enacted by Congress. He can not arbitrarily sell in the absence of legislative sanction nor can he withhold from sale that which Congress has directed to be sold. He can not deny to qualified applicants the rights to use or appropriate the public land conferred by law, even though in the opinion of the executive officer it would be better to withhold the privilege extended to the individual for the common enjoyment of all the people. He can not legislate, nor can he substitute his judgment for that of Congress. To prevent fraud and in aid of proposed legislation to, in fact, effectuate the will of Congress he may temporarily suspend from disposition portions of the public domain, but he can not permanently declare reservations except where authorized by Congress.

In considering the enactment of legislation for the purpose of controlling the natural resources, it must be borne in mind that it is of great importance that every encouragement should be given to their proper development. To prevent by unwise legislation their use would be as pernicious to the public as to permit existing resources to pass into the hands of monopolies.

CONSERVATION POWER SITES.

The increase of population in the West has brought forward the possibility of the use of its great water powers.

That it is the duty of the Government, either acting directly or by intrusting it to individuals to utilize these vast forces, there can be no question. It has not heretofore been the policy of this Government to undertake that which might be more advantageously accomplished by the citizen. The brain and brawn of the individual acting and operating for the benefit of himself, and those dependent upon him, have produced the wealth that makes this country the richest

nation on earth, and any policy which would substitute the activities of the Government for those of the private citizen, except in the performance of those larger affairs where the individual because of the immensity of the undertaking refuses to act, would be a mistake.

These forces, which are now held in common ownership, should not pass into the control of monopolies and unlawful trusts, nor should they be withheld from use. While it would be a political blunder to permit them to pass into the exploitation of a small part of the people, it would be an economic crime to withhold them permanently from all. The one method would permit a part of the people to enrich themselves at the expense of the great majority, or, would require the many to pay tribute to the few in order to enjoy the privileges that these vast forces offer to all. The other would destroy all opportunity and render these natural resources inert and worthless.

The public lands of the United States lying between the meander lines of nonnavigable streams or lakes and such streams or lakes and underneath such bodies or streams, should be reserved for the future use or disposition by the Government; and all tracts of public land valuable as power sites, or for the location of reservoirs, the construction of dams, and other works necessary or incident to the utilization of the water power of the various streams and bodies of water, should be reserved for the use and control of the Government. The enactment of a provision of law of reservation similar to that found in section 2318, Rev. Stat., applicable to mineral lands, is suggested. Such a law would prevent the appropriation of these lands under the public land laws, except as expressly provided. To protect and to conserve the rights of the Government, the law declaring the reservation should be enacted at once, and should be followed, if provision is not made concurrently therewith, by a statute which shall declare expressly the manner in which the rights to these lands may be obtained.

In the past, Congress has, in a number of instances, declared the reservation, and has left the disposal to future legislation, wherein greater time and thought might be given to the details of the methods of disposition, and it may be that such will be the will of Congress in these matters. The necessity for a law declaring the reservation is so cogent that no further discussion is deemed necessary. Any material delay in providing a means by which these forces may be utilized would work a great hardship on all the people, and legislation looking to that end is earnestly recommended at the coming session.

Congress certainly should declare its intention in an unmistakable manner in regard to the question of conservation and reservation. The officers of the Government are entitled to receive from Congress a clear and explicit declaration of its intention, so that there can be

no ambiguity as to the method and manner in which they are to carry out the law. The position of an executive officer who finds himself between the millstones of a popular agitation against the granting of rights and the demand for rights under laws which, as they exist to-day, would bestow them, is a very unenviable one.

THE FIELD SERVICE.

On May 27, 1908, Congress appropriated the sum of $500,000 for the "Protection of public lands, timber, etc.," for the fiscal year ending June 30, 1909, which amount, however, was to be immediately available, and, on March 4, 1909, the appropriation was increased to $1,000,000 for the fiscal year ending June 30, 1910, which said amount was also to be immediately available.

The average number of special agents employed under these appropriations during the past fiscal year was 141, the number gradually increasing from 109 in July, 1908, to 257 in June, 1909. From this appropriation are also paid the salaries of the clerks to the chiefs of field divisions and the necessary temporary employees in this office to properly handle the increased work incident to the large number of reports being received from the field.

The total amount of cash collected and turned into the Treasury as a result of the work of the special agents in the field during the fiscal year is $403,444.26, which amount is $304,755.95 in excess of that collected during the preceding year from the same source, an increase at the rate of 308.8 per cent. Of this total amount collected, $100,868.35 was accepted as settlement for timber trespass, $110,575.91 was recovered by civil and criminal actions brought through the Department of Justice in cases of timber trespass and fines imposed and paid in cases of conspiracy, perjury, subornation of perjury, and unlawful inclosures, and $192,000 was accepted by the Attorney-General and the Secretary as compromise in coal trespass originally investigated by special agents.

As a result of investigations, 1,279,310.67 acres have been restored to the public domain. This is an increase of 135,660.1 acres over the amount restored during the preceding year. Of this total amount restored, 498,240 acres represent area of fraudulent entries (taking an average area of 160 acres to each entry) canceled on special agents' reports, 755,341 acres restored to open range on abatement of unlawful inclosures, and 25,729.67 acres were restored through suits to cancel patents fraudulently acquired, brought by the Department of Justice on the recommendation of this office based on special agents' reports.

Special agents have personally examined and reported on 12,379 entries, 5,308 of which were adverse and 7,089 were favorable. Included in this number are 4,692 reports on lands within known coal areas, of which 1,155 were adverse and 3,537 were favorable, and

1,163 reports on entries within reclamation projects, of which number 98 were adverse and 1,065 were favorable. In addition to the reports of special agents, 1,441 adverse reports and 453 favorable reports have been received from forest officers on entries within national forests. Reports on applications for rights of way over the public domain for reservoirs, canals, ditches, etc., were rendered on 417 such applications, 145 of which were adverse and 272 were favorable. Reports have been received on 54 state segregation lists, under the Carey Act, on which final action has not yet been had. The bona fides of applications for surveys have been investigated and agents have reported adversely on 43 and favorably on 176, making a total of 219 such investigations completed.

Prior to March 4, 1907, 5 civil suits were recommended for the setting aside of grants of rights of way over the public domain for reservoirs, canals, ditches, etc., and from July 1, 1908, to June 30, 1909, 28 such suits were recommended. Investigations are now in progress involving all such grants heretofore approved for such purposes, with a view of bringing civil action against all grantees where the evidence shows misuse, nonconstruction, or abandonment of such privileges.

During the year 241 civil suits have been won and 35 have been lost, of which 101 timber-trespass cases were won, recovering $77,677.79, and 7 were lost; 100 suits to vacate patents were won, restoring 25,729.67 acres to the public domain, and 24 such suits were lost; and 40 cases of unlawful inclosure were won, restoring 289,043 acres heretofore held under fence unlawfully, and 4 cases were dismissed when evidence was produced showing abatement of the inclosures.

At the close of this fiscal year 414 cases wherein criminal prosecution was recommended were pending before the Department of Justice, and during the year 161 cases were referred to the Department of Justice requesting that criminal actions be brought against the offenders in cases of timber trespass, conspiracy, perjury, etc.

Of the criminal cases closed during the year, 24 were convicted for timber trespass, of which 1 was sent to prison and $1,829.92 in fines were assessed by the court and paid; 39 were convicted for conspiracy, 11 of whom were sent to prison, and $36,761 in fines were assessed, of which $23,044.20 were paid; 5 were convicted for perjury, of which number 1 was sent to prison; 34 were convicted for maintaining unlawful inclosures on public domain, of which 5 were sent to prison, and $6,471 in fines were assessed and paid; and 13 convictions were secured in cases of forgery, etc., making a total of 115 convictions secured, in 26 of which prison sentences were given. The large number of acquittals and dismissals in criminal cases, particularly the 35 in timber trespass and the 102 in conspiracy, was the result of a gen-

eral clearing out from the United States court dockets of all old cases which have been allowed to remain on the dockets for years awaiting the securing of necessary additional evidence. The dismissal of many perjury indictments is necessary in view of the meager statement in the public land laws as to what evidence applicants must give under oath. Many matters necessary for the land office to know in order to intelligently consider whether the proofs are true and applications bona fide are required by regulations only. The courts hold that false swearing in these particulars is not punishable.

The foregoing record of work and statistics relate to matter concluded within the fiscal year ending June 30, 1909. The actual publication of this report having been delayed until about November 1, opportunity exists for presenting later data of interest.

The act of March 3, 1909, provides, to a limited extent, for the disposing of the title to public mineral lands and reserving to the Government the title to the coal therein contained. The act in question is applicable only to those persons who had in good faith located, selected, or entered under the nonmineral laws lands which were subsequently found to be valuable for coal. Persons so situated may acquire title to the lands, provided they will take patent by which the coal deposits are reserved to the United States for subsequent disposition under the general provisions of coal land laws.

As this class of entries is necessarily limited, the act in question is more valuable as an experiment than as a remedy to meet the demand for additional legislation in reference to coal deposits in the public domain.

You, while Commissioner of the General Land Office, recommended strongly the necessity of separating the coal from the fee which disposes of the land itself, and in my former annual report I concurred in that recommendation, as more fully appears in another part of this statement.

In order to view the operations of this act, statistics in relation thereto are carried up to October 20, 1909. To that date, of the whole number of entrymen to whom the terms of the act might extend, 2,967 had elected to take the title without the coal; 1,009 refused to accept such title and asked for a hearing to determine the mineral or nonmineral character of the land; 3,886 persons to whom notice of election has been given have not yet made reply thereto, and 3,539 are yet to be notified.

From this it appears that of the entrymen who have already acted upon the invitation to accept the terms of the act, 75 per cent have taken title to the land without the coal; of the remaining 25 per cent, practically all base their refusal upon a bona fide belief that the particular lands covered by their entries are not valuable for coal, and hence hope to secure the entire fee.

The operation of this act seems to demonstrate that a general law by which homestead, desert, or other surface-use applicants will ultimately acquire title to and get the beneficial use of the surface of public lands without taking therewith title to the minerals that may be herein contained, would prove successful in its operation. Such a law would also eliminate one of the strongest incentives and prolific sources of fraud with which the General Land Office is compelled to deal.

RIPARIAN RIGHTS.

The courts hold that the title to the beds of or the lands that underlie navigable lakes or streams is in the State where situated, in virtue of the sovereignty of the State, but that the Federal Government as proprietor is or was the owner of the beds or lands that underlie nonnavigable lakes or streams. While the distinction is clearly drawn as to the ownership of the beds of navigable and nonnavigable bodies of water, the practice has grown up by which the Government after it has established its public surveys or meanders around such bodies of water asserts no further ownership over the beds thereof, even though the lakes, ponds, or rivers are nonnavigable, and it is now the rule that the purchasers from the Government of the fractional subdivision of land abutting on such streams or bodies of water are held to take to the center of such stream or body of water, notwithstanding the fact that they pay for only the acreage amount of land contained in the fractional subdivision. The Supreme Court in the case of Kean *v.* Calumet Canal and Improvement Company (190 U. S., 452) recognized the existence of the rule, and in discussing its origin, states: "The title to such land was not considered of much importance in the early days or worth the trouble of an independent survey. (See Newsom *v.* Pryor, 7 Wheat., 7, 11.) The United States was more anxious for settlers than for revenue from that source. It is not necessary to consider how we should decide the case with our present light if the question were a new one. It is not new. For twelve years the decisions in Hardin *v.* Jordan and Mitchell *v.* Smale have stood as authoritative declarations of the law. Probably in most cases the statute of limitations has cured the defects of title which those cases may have shown. Meantime many titles must have passed on the faith of those decisions. The United States can meet them by the form of its conveyances." As the rule has become so well established that the Supreme Court recognizes and enforces it, it is not believed that it would be safe for the Government to rely upon a condition to be placed in a patent by the General Land Office unless such condition is authorized by law. It is therefore recommended that Congress enact into law a provision restricting the ownership or estate under a government patent to lands abutting

or adjoining meandered streams to the parcel or parcels actually entered and paid for, reserving to the United States the unsurveyed lands forming the bed or underlying the body or stream of water. One who purchases and enters a tract of government land situated upon the water course has no right either in law or equity to demand more than the land which he enters and pays for, and while in the past the Government has suffered the loss of large and valuable tracts of land covered by shallow lakes, the waters of which soon receded and left uncovered areas of great fertility which were appropriated by the abutting owners who received many times as much land as that embraced in their original purchases, yet the matter was probably of not such importance as to demand the attention of Congress; but now since in many of the western States the control of banks or beds of these streams is of vital importance in connection with the storage and flow of water, and of the establishment of water-power sites, and since there is a wide demand that the Federal Government should undertake the drainage of large areas of swamp and overflowed lands, the question of the ownership of the lands underlying these bodies of water or streams is of such importance that it is believed Congress should, in order to remove any question, enact into law the provision above suggested. Furthermore, during the past year a number of inquiries have been received at this office with respect to the rights of the individual to establish a mining claim between the meander lines of a nonnavigable stream, it being represented that minerals in paying quantities were to be found in the banks or beneath the waters of such streams.

COMMUTATION LAW.

The commutation clause of the homestead law should be either repealed or the time in which commutation proof can be made extended from fourteen months to three years. The object of the Government is to obtain settlement on the public lands of the United States and homes thereon, and not merely to relieve itself of the ownership of the remaining area of the public domain. With the increased demand for homes incident to the increase in population, greater care should be taken with the remaining acreage, and the public domain should be kept for those only who desire to make a home. The law should also be changed so that no man can prove up unless he has become a full citizen of the United States. Instances have been called to my attention where a foreigner has declared his intention to become a citizen, made entry upon public land, proved up under the commutation clause of the homestead law, mortgaged the land, and then deserted this country to return to that from which he came without having lost his citizenship therein. The few remaining acres of the public domain are entirely too precious, and

there are too many American citizens who desire homes thereon, for the Government to continue to render it possible for a foreigner to acquire title before he has become a citizen and without any intention of so doing.

KINKAID ACT.

Proofs are now being made under the act of April 28, 1904, which grants a homestead right of 640 acres in certain parts of Nebraska. Careful scrutiny is being made of the proofs so presented. In a great majority of cases there is every evidence of good faith. About 25 per cent are found deficient and fraud may exist. I was enabled to make a very brief trip into part of the country covered by this law, and was agreeably surprised at the successful homesteading which had been done under its terms. The most valuable spots in the lower lands have been picked out by the homesteader for the purpose of growing grain. The country that I traversed was of a rolling character; sufficient moisture seems to be secured in the draws for the purpose of growing grain enough to feed the stock during the winter time and provide flour for the family use. These tracts were naturally only small ones. The remaining acreage was used successfully for pasturing purposes. Comfortable houses had been constructed and homes had been provided in a country where no homes could have existed in the more limited acreage of 160 acres. I am free to confess that my prejudices were rather against instead of being in favor of this act, but from the limited area that I saw I should judge that the act, if enforced as it is being enforced now, would be productive of good and greatly for the benefit of the small rancher, as under it the public domain is being put to its highest and best uses, instead of being left as an open and free range for the cattle of those who had money enough to run large herds of stocks under the protection of their herdsmen.

It is imperative, however, for the success of this experimental act that very careful supervision be given to all proofs made, in order that its provisions may not be taken wrongful advantage of and the act fail in its purpose to provide homes, where homes could not be made on the provisions of a 160-acre homestead law.

TIMBER AND STONE LAND.

The efficacy of the instructions of November 30, 1908, being regulations in regard to the sale of timber lands under the act of June 3, 1878, has not as yet been thoroughly proven. From present indications it would seem that they would not be an entire success. There is outstanding a considerable amount of scrip, all of which is valuable for location of lands of this character. If the appraisement under these regulations be, therefore, above the market price of this

scrip, the applicant, instead of paying the appraised value in money to the Government, purchases the scrip and locates it upon the land; in this way the Government loses the land and the Reclamation Service loses the money for its work, and the only beneficiary is the owner of the scrip, which in this way secures a cash market. There are, of course, very few timber lands of any value left which are not within a national forest, the exceptions being mainly unsurveyed tracts which have not as yet, therefore, been subject to entry. A law should be enacted, however, under the terms of which timber on the remaining lands can be sold at an appraised value and the fee to the land be reserved, in the Government subject to homestead or other application, a preference right being given, however, to the homestead applicant to purchase the timber at the appraised value if he so desires.

It is now known that tracts of land in the short-grass countries have been purchased under the act of June 3, 1878, and acts amendatory thereto, under the guise of stone lands, which were really desired for grazing. This, of course, has stopped under the rules and regulations adopted as above, which called for an investigation and appraisal of any tract prior to its acquisition under the law. The 320-acre homestead act, so called, will probably meet this situation where a homesteader in a semiarid country made use of the act of 1878 for the purpose of adding 160 acres of grazing land to his original 160 which he intended to cultivate.

OPENING OF INDIAN LANDS.

Eight hundred and thirty-eight thousand acres of Rosebud (Tripp County) Indian lands were opened under the homestead and townsite laws, pursuant to the act of March 2, 1907 (34 Stat., 1230). The President's proclamation of August 24, 1908, prescribed the plan of the opening.

One hundred and fourteen thousand seven hundred and sixty-nine persons presented applications for registration, 6,000 of whom were assigned numbers. Four thousand of the successful applicants were given the privilege of making entry in April, 1909, and 2,000 in September, 1909. The former were required to pay for the lands at $6 an acre and the latter at $4.50 an acre. Lands not entered by the successful applicants became subject to entry under the general homestead laws on October 1, 1909, at $2.50 an acre.

Four townsites, Witten, Minneota, Wewela, and Wamblee, were reserved and surveyed into blocks and lots. The lots were offered for sale under the supervision of the register and receiver at Gregory, during June, 1909, in accordance with the regulations of the Secretary of the Interior of April 24, 1909.

ONE OFFICER IN CHARGE LOCAL LAND OFFICE.

Better administration would be secured in the local land offices if the positions of register and receiver were abolished and one position of administrator were created. There is friction between the register and receiver in many localities. While duties of the two officers could be easily defined by law, yet they are both required to sign decisions and in other ways occupy positions of equal weight and importance. In view of the fact that decisions in all cases are appealable to the commissioner, and from the commissioner to the Secretary, there is no necessity for dual supervision of all records. In fact it will be found that, as a general thing, one officer or the other signs as a mere perfunctory matter. In addition to this, by the substitution of a clerk who should be bonded and under the direct supervision of the Commissioner of the General Land Office, and who should be intrusted with the care and receipt of the moneys, from $150,000 to $200,000 a year could be saved the Government. The salary of the receiver and of the register is $3,000, each. In the large offices a good and efficient clerk could be secured for the purpose of accounting for the moneys received, at a salary of $2,000, a less sum to be paid where the office is not maximum in its work. In this way the United States would save a large sum each year, and the work would be performed in a manner more satisfactory than at present, and dual authority and constant conflicts avoided.

SALARIES, BOARD OF LAW REVIEW.

On the matter of salaries I have repeatedly urged upon the Committee on Appropriations the necessity of greater recognition in the increase of remuneration of those who fill the more important positions. There has been no response to these. Heretofore I have urged these increases because the required services properly performed demanded more pay; in other words, because it was right. Now, however, from a practical or business standpoint a much more cogent reason is presented. The office has met with much difficulty during the past six months in securing adequate review of the important law questions presented for consideration, for the reason that there have been three voluntary vacancies on the board of law review since the 1st of April, and the board is composed of only 5 members. Two secured other and more advantageous positions under the Government and one resigned to resume the practice of law. The task of supplying the vacancies was not an easy one, particularly the place of the expert examiner of mineral and coal cases, and this was satisfactorily accomplished only by transferring the duties to one of the remaining members and by reassigning a portion of the work there-

tofore performed by him. While it has always been and is now the policy of the office to free its practice from technical observance, and while a well-trained lawyer may soon adjust himself to the work of the office and render valuable services in any of the several divisions, yet before the proposed decision or letter which he may prepare receives final action it is absolutely necessary that it be critically examined by one or more reviewers who are skilled in public land laws and who are familiar with the decisions and practice of the department, this office, and the local land offices.

There have been a multitude of statutes passed at different times for the disposition of the public domain and many of them are conflicting, and it takes time and long-continued effort intelligently directed to fit a reviewer for this important and exacting work. The office is daily rendering decisions that affect property rights of great magnitude and requiring not only the examination and interpretation of numerous statutes, but an application of the principles of law as construed by the various courts—state and federal. It is of this that the commissioner and assistant commissioner, who render these decisions, must have the advice and assistance of a well-equipped and thoroughly qualified law force. To secure a more critical and comprehensive system of law review, you, when commissioner, reformed the method of examination theretofore in force and organized the board of law review, with the chief law clerk, 2 law clerks, and 2 law examiners as members thereof. The change in the plan of work has unquestionably resulted in securing a more expeditious and comprehensive examination, but as the salaries paid these officers are wholly inadequate, the result is that the office finds it impossible to retain the services of its trained and experienced law reviewers. A similar condition exists in the mineral, one of the most important divisions of the office, which has been seriously crippled. The work in the mineral division is of a technical character, and a man can not enter that division and become competent to pass upon the many vexed questions which arise thereunder and which very often involve millions of dollars, without careful training for many years; and yet the highest salary in that division is $2,000, which is a less sum than is often received for a brief upon which its recipient is called upon to pass. Since January of this year four lawyers engaged upon this work have left the office to either receive more remunerative positions in the government service or to embark upon private practice, and one has been lost through death; as a consequence the division is crippled, with no immediate prospects of building it up. I feel confident that had the adequate salaries been given we could have retained the services of at least three of these gentlemen.

ADDITIONAL ASSISTANT COMMISSIONER.

There should be established the position of second assistant commissioner, who should have the duty of supervising the details of the special agents and the work in preparation of cases for submission to the office. Under conditions as they at present exist the commissioner and assistant commissioner are required to pass upon all cases and judicially determine them. When the multitudinous work of this office is thoroughly understood the impossibility of these officers giving due care to the consideration of cases presented is easily grasped. In addition to this, the commissioner is supposed to supervise the special agents in the field and keep track of the work which they are performing and the manner in which they are attending to the more important cases which will have to be presented to him subsequently for his consideration. This, it can readily be seen, is an entirely erroneous procedure. It means that the officer who is supposed to have the final say in the determination of these cases, and whose mind should be absolutely open and free, has, by force of the system, to know something of the preliminary work in the preparation of the cases upon which he is to pass. A parallel case could only be supposed if the judge on the bench had the duty, which is now vested in the United States attorneys, of preparing the case for submission to himself.

During the past year this erroneous procedure has been obviated as much as possible by the imposing upon an officer, who is paid out of the special agents' fund, as many of the duties of a directory character as can possibly be put upon him without a violation of law. The only correct way, however, to solve many of the difficulties of administration with which this office is confronted would be to raise this position to the dignity of an assistant commissionership, with well-defined statutory powers, so as to divest the commissioner of the conflicting duties of jurisdiction over the agents who prepare the cases of the Government, and of passing upon the case when prepared and submitted by these agents. There would naturally be a check upon the work of this assistant commissioner, for, if all cases were manifestly illy prepared, the attention of the commissioner would of necessity be brought to this state of affairs. There is no other position in the Government of the United States which presents so great an anomaly. The office of commissioner as originally constituted was that of a salesman and collector of moneys, but the numerous laws which have been passed and which need judicial interpretation, and the applications thereunder, which have ceased to be merely a bid for lands and of payment therefor, but have become applications under laws which demand the fulfillment of certain prerequisites, have rendered the position of commissioner as

much a judicial position as an executive one. The difficulties in filling the position have arisen largely from this impossible situation which has grown up so gradually with its contradictory features that they seem to have not been noticed.

CHIPPEWA LOGGING, MINNESOTA.

During the year ended June 30, 1909, there were cut from ceded Chippewa lands in Minnesota 94,028,725 feet, of the value of $601,091.18, as against 157,541,960 feet, valued at $1,056,082.78, cut the previous year. This falling off of 63,500,000 feet was largely due to the dullness of the lumber market. There have been already cut from ceded Chippewa lands during the six logging seasons 733,174,577 feet of timber, of the value of $4,771,167.52, and there are estimated to be from 150,000,000 to 200,000,000 feet sold but not yet cut. The amount cut has considerably overrun the estimates. According to the original government estimates, there were sold 563,142,000 feet of timber for $3,706,910.47. It will be seen that there has been realized over $1,000,000 more than the estimated amount of all sales, and there is nearly $1,000,000 worth of timber yet to be cut. The average price paid for the timber thus far cut was $6.51 per thousand. The total cost to the Indians for superintending, scaling, and recording the logging of this timber for the six years has been $189,102.49, an average cost of 25¾ cents per thousand feet.

The existing laws relating to the disposal of timber on ceded Chippewa pine lands in Minnesota appear to be insufficient. At each of the sales of said timber there has been unsold considerable scattered timber, which, by reason of the small amount of timber and its want of compactness, has not attracted mill men. At the last sale of timber, including lands outside of the Minnesota National Forest, there were unsold 62,000,000 feet, scattered over 46,054 acres, on 6 different reservations.

Provisions should be made for opening these tracts to homestead settlement, with the requirement that the settler pay the minimum price for the timber. Where, for any reason, it is not deemed advisable to open the land to homestead settlement, such as where the land is covered by an exchange of Indian allotment, subject to the right to sell the timber, or the land is included in the national forest, a reoffering of the timber should be permitted without the requirement that notice be published in twenty-six newspapers and magazines, as provided by existing law. A less number of notices would, it is believed, reach all prospective purchasers.

At the second session of the Sixtieth Congress there was introduced H. R. 27871, which embodies the views above expressed, and if enacted into law would give the relief desired.

ACT MARCH 1, 1907.

The department should call upon the State of Colorado to specifically accept the provisions of the amendatory acts of March 1, 1907 (34 Stat., 1057), and February 24, 1909 (— Stat., —), extending the provisions of the Carey Act to the Ute Indian reservations.

The constitutionality of segregations under these amendments has been questioned, upon the following grounds:

I. They lay burdens on the State not contained in the original act, in that they require the State to pay $1.25 per acre for all lands patented thereunder, and that an additional state act accepting the amendment is necessary.

II. That the Colorado state constitution provides that no moneys be paid out excepting as provided by law.

III. That the state act accepting the provisions of the Carey Act provides that all moneys received from the sale of Carey Act lands be paid into the state treasury, and that therefore there are and can be no funds legally available to pay for the lands which the Carey Act land board contracts to pay for.

IV. That the said state law only accepted the donation made by the Carey Act, and, having been passed previous to the two Carey Act amendments above referred to, did not contemplate payments for such lands; that such act authorized the state land board to ask for the segregation and contract for the reclamation of lands only under the original Carey Act, which provides for the donation of such lands "free from cost of survey or price."

This question is now before the department on appeal, but however it may be decided it is thought that a state act should be passed to quiet title and leave no question open which might in future lead to litigation and great hardship upon innocent purchasers.

RIGHTS OF WAY.

In the last annual report attention was directed to needed legislation in regard to the right-of-way acts. There are many such acts—some general in character, and others special, and they differ in the estate granted and the purposes for which the rights of way may be used. Recommendations have been made to have these various acts brought together and included in one general act, which would cover all the purposes desired by applicants, with certain changes as to forfeiture for nonconstruction or nonuse. So far, no legislation has been had along this line.

Where rights of way are granted under sections 18 to 21 of the act of March 3, 1891 (26 Stat., 1095), it requires some declaration of forfeiture either by Congress or by the courts to relieve the lands of the easement granted. The same is true in the case of the railroad right-of-way act of March 3, 1875 (18 Stat., 482), but by the acts of

June 26, 1906 (34 Stat., 482), and February 25, 1909 (35 Stat., 647), Congress declared forfeited to the United States, under certain conditions, such rights of way where the proposed line of road had not been constructed.

Under both these acts there are many mere paper rights of way which lie as a burden upon the public lands and cloud the title to such lands when entered by individuals.

During the last year many investigations have been made of rights of way under the act of March 3, 1891, to determine whether the works have been constructed within the time allowed by the act, and also whether they were being used as contemplated when the right was granted, and reports have been received under which action has been and is being taken looking to the clearing of such rights of way from the public lands and from the records of the General Land Office. Where the grantees have not relinquished, it is necessary to recommend suit to set aside the right of way granted, which is at all times very expensive and consumes a considerable length of time to bring about the desired result.

Legislation should, therefore, be had which will change the present conditions.

HOMESTEAD ENTRIES IN FOREST RESERVES.

During the past year notices were issued by this office in 1,125 lists of lands in national forests, by which approximately 140,000 acres of agricultural lands were opened to settlement and entry under the homestead laws, in accordance with the provisions of the act of June 11, 1906 (34 Stat., 223).

RECLAMATION PROJECTS.

There are now 30 reclamation projects, either completed or in various stages of construction.

In connection with 15 of these projects, public notices announcing the time when water can be furnished for the lands, the amount and date of payment of the charges, and other data, have been issued and farm-unit plats have been approved as a basis for the allowance of homestead entries, for the conformation of homestead entries made prior to approval of the plats, and for water-right applications.

In connection with three of the projects farm-unit plats have been approved, but public notices have not been issued.

NATIONAL MONUMENTS.

Under authority of the act approved June 8, 1906, the President, by formal proclamation prepared in this bureau, created during the year, and out of lands under the control of the United States, two national monuments, as follows:

The Tumacacori National Monument, embracing one of the best preserved and oldest of the early Spanish mission churches in Arizona. This monument was made possible by the relinquishment of 10 acres of ground included within an entry made under the homestead laws. The date of construction of the church is unknown, but probably it was late in the sixteenth century.

The Navajo National Monument, situated within the Navajo Indian Reservation, in Arizona, embraces an unknown area, but within which are known to exist numerous important prehistoric pueblo ruins, some of large size, which have not been explored or definitely located. Surveys to fix the locus of each important ruin within the present monument limits will be made during the year 1910, and as soon as possible thereafter a form for a proclamation restoring to the Indian reservation all of the lands now reserved, except the smallest tract around each ruin necessary to protect same, will be submitted to the President for his consideration.

Two monuments created within national forests, and therefore under the jurisdiction of the Agricultural Department, are as follows: The Wheeler National Monument, in the Cochetopa National Forest, Colorado; and the Mount Olympus National Monument, in the Olympic National Forest, Washington.

Funds for the proper protection and administration of such of these monuments as are subject to unauthorized exploration, excavation, and removal of prehistoric relics and other reserved objects are greatly needed. The department estimate of $5,000 for this purpose, which failed of appropriation last year, should be renewed.

BIRD RESERVATIONS.

During the fiscal year thirty-five new bird reservations were established by executive order on recommendation of the department, after careful consideration by this bureau, and two prior bird reserves were enlarged. The new reserves are distributed over the widely extended area embraced between Porto Rico, Alaska, and the Hawaiian Islands, including twelve public-land States and Territories outside of Alaska. They are composed of lands, as far as known, unfit for mining or agricultural purposes, the majority being small coast line or open-sea islets and naked rocks, upon which myriads of water fowl of many species breed. Seventeen of the reserves, however, embrace Reclamation Service reservoir sites with the smallest legal subdivisions of land adjoining their shore lines, but these reservoir reserves are made subject to Reclamation Service use under the reclamation acts. The distribution of the reserves is as follows:

Key West, Pine Island, Matlacha Pass, Palma Sola, and Island Bay, on the western and southern coast of Florida; East Park and Farallon, California; Klamath Lake, in Oregon and California; Lake

Malheur and Cold Springs, Oregon; Chase Lake, North Dakota; Loch Katrine, Shoshone, and Pathfinder, Wyoming; Bellefourche, South Dakota; Strawberry Valley, Utah; Salt River, Arizona; Deer Flat and Minidoka, Idaho; Willow Creek, Montana; Carlsbad and Rio Grande, New Mexico; Keechelus Lake, Clealum Lake, Bumping Lake, and Conconully, Washington; Yukon Delta, Bering Sea, Pribilof, Tuxedni, St. Lazaria, and Bogoslof, Alaska; the small islands of the Culebra group, Porto Rico, and the extreme western rocky islets of the Hawaiian Archipelago.

The reserves enlarged are Pelican Island and Mosquito Inlet, Florida. The enlargement of the former was made necessary because of the marked success attained in protecting birds thereon. A great overflow from Pelican Island to adjacent islets was forced by reason of the increase in bird life. Mosquito Inlet was enlarged to embrace a number of marshy and worthless islets to the south of the original reserve.

These additions to the bird reserves are of great importance and value because the wide extent of territory within which they are located insures the protection and preservation of the birds which largely represent the edible and otherwise commercially valuable avifauna of North America, excepting only the birds of prey and the song and insectivorous birds, whose protection can not be promoted through the reservation of public lands.

The birds upon these reserves embrace all the species of wild geese and ducks, swan and numerous species of edible waders and shore birds, pelicans, gulls, tern, black skimmers, cormorants, herons, murres, petrels, puffins, guillemots, oyster catchers, and many other sea birds.

CONDITION OF BUILDING.

By the transfer of the Bureau of Indian Affairs to the Pension Building this office secured the equivalent of sixteen additional rooms in which to accommodate its employees, thus in some measure relieving congestion, and the appropriation of $5,000 with which to erect a new chimney within the court of the building will render six additional rooms, now heated beyond endurance during the summer season, habitable for clerks. A redistribution of several divisions in the bureau, made possible by the additional rooms, and some consolidations of work, also made possible thereby, have improved administrative conditions and increased the efficiency of the force.

The request for an appropriation of $10,000 for new furniture and floor covering, particularly for sanitary desks, recommended in my last report, is respectfully renewed, and the covering of all slate floors by linoleum is again earnestly recommended. The regular allotment from the departmental contingent fund has never been sufficient to meet these extraordinary expenses.

LAW LIBRARY.

Prior to June 30, 1893, there had been for many years an annual appropriation of $500 for the law library of the General Land Office. The appropriation for the fiscal year ending June 30, 1894, was reduced to $400, and therefore annually that amount was made available until June 30, 1898, when the appropriation was reduced to $200. The amount last named was continuously appropriated annually from June 30, 1898, to June 30, 1908. For the fiscal year ending June 30, 1909, an appropriation of $400 was made, and the same amount was provided for the fiscal year ending June 30, 1910.

During the time that the office had at its disposal the amount of $500 annually it began the purchase of the reports of the courts of highest resorts of the public-land States and Territories, and the purchase of these reports was kept up until the reduction in the appropriation which became effective June 30, 1894. After the date last named the office was compelled to discontinue the purchase of some of these reports, and when the appropriation was reduced to $200 it became necessary to drop all state and territory reports, as the amount available was scarcely sufficient to provide for digests, annuals, and the more important texts. As Congress for the fiscal year ending June 30, 1909, placed at the disposal of the commissioner the amount of $400 for the purchase of law books, the office has been able to bring up the California reports to date by using a portion of the funds appropriated for the current year, but at this rate it would take at least fifteen years for the office to bring the state reports to date. An appropriation of $2,000 presently available would enable the office to fill out or bring to date the reports of the States and Territories wherein the greater portions of the public lands are now situated, and a continual appropriation of $500 a year thereafter will probably suffice. The condition is presented that the law library has in it fragmentary sets of the reports of fifteen or twenty of the public-land States and Territories, and with the exception of the State of California all of these reports are about fifteen years in arrears, or rather the office has none of the reports of the various States except California covering the proceedings of the courts later than the year 1895. The reports on hand represent the expenditure of large sums of money, and because of the fact that they are not up to date are of comparatively little value, and the expenditure of the small amount mentioned will enable the office to complete the various sets and keep them abreast with the times. It frequently happens that examiners are required to visit the Supreme Court and other law libraries to consult the missing reports of these public-land States and the bringing up of these reports will not only tend to the efficiency of the law work but will save much time of the examiners that is now spent in

examining and visiting other libraries to secure the information which should be found in the law library.

NATIONAL FORESTS.

Since the issuance of the last annual report, 8 additional national forests have been established under section 24 of act of March 3, 1891 (26 Stat. L., 1095), 34 have been enlarged, and 10 reduced. To secure greater administrative efficiency, 57 large forests have been subdivided and, with 27 small forests, rearranged as 96 national forests and, by grouping from 2 to 5 small forests, 23 forests have been formed of 57. The names of 6 have been changed, and the Magdalena has been consolidated with the Datil National Forest, New Mexico. There are now 150 national forests, embracing 194,505,325 acres. The total increase in area of national forests since the beginning of the fiscal year is estimated at 26,528,489 acres, 2,511,405 acres thereof having been added from existing Indian reservations in Arizona, California, and New Mexico.

Areas temporarily withdrawn but not needed for forestry purposes are released from withdrawal upon recommendation of the Secretary of Agriculture as rapidly as possible. Since the issuance of the last annual report, 221,539 acres have been released from such withdrawal, and 442,344 acres eliminated from national forests and opened to settlement and entry.

During the fiscal year 833 administrative sites, embracing 114,580 acres, and 26 rights of way for wagon roads have been withdrawn for use by the Forest Service in the administration of the national forests. The restorations have been 1 right of way and 69 administrative sites, embracing 13,153 acres. There are now 25 rights of way and 4,276 administrative sites, embracing 621,878 acres, 122 sites and 19,974 acres being near and 4,154 sites and 601,904 acres in the national forests.

IMPERIAL RESURVEYS, CALIFORNIA.

Since my last report the work of completing the resurveys in the Imperial Valley has been finished and the plats filed. In segregating entries and school lands, it was found that many complaints arose among rival claimants as to the proper relocations of the original surveys made in 1854. As it was not possible that amicable adjustments could be made among themselves and appeals having been frequent and numerous to this office over boundaries in controversy, I directed a special agent of this office, one familiar with the conditions to be found there and conversant with public land surveys, to go upon the ground and endeavor to adjust the claims according to the lines of the present resurvey, so that litigation might be avoided

and all parties satisfied. Mr. R. H. Satterwhite was selected and has nearly finished his work. The lands embraced in the resurvey were meanwhile suspended from entry.

ORIGINAL SURVEYS BY SALARIED OFFICIALS.

In connection with the statement of work done by examiners of surveys in the Territory of New Mexico, and referring to my recommendations in annual reports of 1907 and 1908 in regard to contract surveys, I have to report as to the comparative expense of the two systems.

Two examiners were, at the request of the surveyor-general of New Mexico, employed in making new surveys applied for by settlers and authorized upon favorable reports by the field-service agents. The said surveyor-general, who is in favor of a change of method, in his annual report discussed the matter and takes the work of one examiner as a guide. The cost of the field work by this examiner is about $7.50 per mile, while under mileage rates the average would be $6 per mile. Taking the other examiner's work, which involved many reconnoissances, the expense is much greater, probably 100 per cent. The expense of an examination must be added to the rates in order to compare, but this would amount to but $1 per mile. In the case cited the cost would then be about the same for the two methods, with the advantage in favor of the salary method on the score of greater accuracy and saving of time. An exact comparison is somewhat difficult owing to impracticability of arriving at the classification of the lands surveyed as to the extent of difficulties encountered.

In the case of the survey of the Blackfeet Indian Reservation, Mont., just completed, the cost thus far, under salaried surveyors, has amounted to about $10 per mile.

Whether this is less than or more than the cost under the contract system can not well be determined, but it may be said that in estimating the aggregate liability of the contracts for the survey of this tract, the surveyor-general of Montana placed the probable cost under contract at $10 per mile. It can be safely assumed, however, that surveys by contract will be a trifle less—a fraction of a dollar—than under the salary method.

Other things, such as accuracy and expense, being equal, surveying under salary is preferable, because of the consequent avoidance of delay in securing proper inspections. Under the present regulations hardship to the deputy is mitigated by partial payment recently instituted, but the more important desideratum, the opening of the land to entry, is secured many months earlier.

I hope to have before the next annual report more exact data to present as to the relative expense of the systems bearing upon the question of inaugurating the salaried method.

The amount of acreage of lands added to the surveyed area during the last fiscal year is 9,749,477 acres, which exceeds the work of the previous year by nearly 4,000,000 acres (3,947,543).

OTHER RESURVEYS.

Resurveys are now in progress in several States—Wyoming, Nebraska, and Colorado—all authorized by special acts of Congress. Examiners of surveys are engaged upon this work in Nebraska, where there is no surveyor-general, and in Colorado, where there were railroad lands involved.

ORIGINAL SURVEYS BY EXAMINERS OF SURVEYS.

Many original surveys have been during the fiscal year executed by officials of this office instead of being placed under contract.

The survey and subdivision for allotment of the Blackfeet Indian Reservation, Mont.

The completion of the survey and subdivision for allotment of the Flathead Indian Reservation.

The survey and subdivision for allotment of the Fort Peck Indian Reservation, Mont.

Four townsites on the Rosebud Indian Reservation, S. Dak.

One townsite on the Colorado Indian Reservation, Ariz.

One townsite on the Yuma Indian Reservation, Ariz.

One townsite on the Fort Peck Indian Reservation, Mont.

Township surveys for allotment, Moqui Indian Reservation, Ariz.

Township surveys, public land, New Mexico.

Survey of Mission Indian Reservations, southern California.

Segregation surveys for national monuments, southeastern Utah.

Survey of drainage reservation for Durango, Colo.

Island surveys in various surveying districts.

The work in all these cases has been more satisfactorily performed than under the contract system.

LEGISLATION.

It is recommended that legislation to effect the following purposes be enacted:

1. The reservation of tracts of public land containing sites adapted to the construction of works for the utilization of water power. (See page 61.)

2. The reservation for future disposition of the public lands of the United States situated between the meander lines of nonnavigable streams or lakes and underneath such bodies or streams. (See page 56.)

3. Amendments of the rights-of-way acts which will permit the Secretary of the Interior to declare forfeited, for nonuser or non-

construction within three years, of a right granted under the act of March 3, 1891. A revision of all the rights-of-way acts and the combination thereof into a comprehensive act is earnestly suggested. (See page 74.)

4. A provision whereby the Chippewa Indian lands on which there is standing pine timber, but not sufficient in quantity to render it salable, be entered under the provisions of the homestead law with the requirement that the claimant pay the appraised value of the timber. (See page 73.)

5. An act which will permit the lease or sale of coal deposits both in the United States and in Alaska to an association of qualified persons, not more than 160 acres in extent to each person and an amount not greater than four sections for the common use and benefit of the individual members of the association at a per ton royalty. Any of the rights acquired under the provisions of the proposed act, to be subject to the antitrust clause of section 3 of the act approved May 28, 1908, entitled "An act to encourage the development of coal deposits in the Territory of Alaska." (See page 58.)

6. Amendment of the Carey Act requiring construction work to be performed upon every project within three years of the approval of the segregation, with the authority of the Secretary of the Interior to extend the time within which construction must be commenced, if, in his judgment, the reasons are sufficient, and that each year the State be required to file proof of the actual work done on each segregation, and for failure to begin the construction as above suggested, or to file the yearly proofs, the Secretary be authorized to cancel the segregation.

7. Authority should be granted the commissioner to quitclaim lands in forest reserves which were, prior to March 3, 1905, relinquished to the United States under the act of June 4, 1897 (30 Stat., 36), in cases where the said act of March 3, 1905, bars such selection, and where no fraud was attempted against the United States.

8. Section 461 of the Revised Statutes as amended by the provision of an act entitled, "An act authorizing the resurvey of certain townships in the State of Wyoming, and for other purposes," approved May 29, 1908, should be further amended so as to provide that photolithographic copies may be furnished by the commissioner at 25 cents each; and photographic reproductions at 25 cents per sheet, uncertified, with an additional charge of 25 cents for the certificate of the commissioner to the photolithographic copy of township plats without seal; and the amount received from the sale of photolithgraphic copies of township plats should be converted into and made available under the annual appropriation for reproducing plats of surveys.

9. An amendment of the law, so as to permit the fees collected by the local land officers, in connection with the making of plats and transcripts of records in their offices, to be made available for the employment of clerical assistance. Surveyors-general should be given the same authority.

10. To punish persons who fraudulently obtain, or attempt to obtain, title to public lands, and for other purposes. (See page 58.)

11. To empower officers, clerks, inspectors, agents, and employees to administer oaths, and for other porposes. (See page 58.)

12. To amend an act providing for the compulsory attendance of witnesses before registers and receivers of land offices. (See page 59.)

13. To provide for the punishment of officers who attach false jurats or certificates to affidavits or papers, and for other purposes. (See page 59.)

14. The Secretary should be authorized at, or immediately prior to, beginning the survey of contemplated irrigation works to withdraw from all forms of entry all lands that may be irrigated from such work, or are believed to be susceptible of irrigation therefrom. The latter class of lands to be restored where farm units have been established and water is available, or if it is found that parts of the land so withdrawn are not susceptible of irrigation they may be restored at any time within the discretion of the Secretary of the Interior.

15. Provisions should be made under the reclamation act for the assignment of entries upon the acceptance of the General Land Office of the final five years' proof; title to issue to the assignee upon compliance with the remaining provisions of the reclamation law, provided, that such assignments shall be for the entire tract.

16. It should also be enacted that if by reason of change of plan, or for any other cause, it becomes evident that the whole or any part of the lands included in any segregation under the provisions of the Carey Act, and amendments thereto, are in fact nonirrigable under the system proposed, and upon which the segregation was made, the lands so nonirrigable shall be relinquished by the State upon the request of the Secretary of the Interior, and if such State fails or neglects to execute and deliver such relinquishment within a reasonable time after being requested so to do, the Secretary of the Interior be authorized to cancel the segregation as to the nonirrigable lands and restore the same to the public domain.

17. The townsite laws should be so amended as to authorize the Secretary of the Interior to set apart and reserve for school, park, and other purposes not more than 10 acres of each section of public or Indian lands withdrawn for townsite purposes. Authority should be given the Secretary of the Interior to direct the reappraisement of lots within townsites when he may deem it advisable.

18. Section 2301 of the Revised Statutes, and all laws allowing commutation of homestead entries, should be either repealed or the time in which such commutation proof can be made should be extended from fourteen months to three years. (See page 67.)

19. The sum of $5,000 should be made available for the protection of national monuments under the control of the Interior Department.

20. An amount sufficient to enable the Commissioner of the General Land Office to complete the fragmentary sets of the various state reports should be provided, and the salaries of the chief law clerk, two law clerks and two law examiners, the chief of the mineral division, and the chief clerk should be so increased as to provide adequate remuneration for the services rendered.

21. The Secretary should be authorized to withdraw from entry or disposal upon proper application by the State, under the Carey and amendatory acts, such tracts of unappropriated nonmineral public land as may, in his judgment, be deemed necessary for the purpose.

22. For the health, comfort, and convenience of the clerks and employees of this office, and to enable them to more effectively perform their duties, the sum of $10,000 should be appropriated for the purchase of carpets, desks, and other necessary office furniture.

23. The position of second assistant commissioner, or an additional assistant commissioner, who shall have charge of the field service of this office and perform such other duties as the commissioner may direct, should be established. (See page 72.)

24. The positions of registers and receivers of local land offices, as now constituted, should be abolished, and in their stead provision made for an administrative officer, probably under the designation of register, who shall combine the duties of register and receiver. (See page 70.)

25. The mineral-land laws of the United States should be extended to the States of Alabama and Minnesota. There is no reason why this should not be done. There are at present coal-land laws in Alabama, and should a new coal-land law be passed its provisions should certainly be extended to that State. There are still certain mineral lands left in the State of Minnesota, and the mineral laws should be applied so as to operate in that State.

Respectfully submitted.

FRED DENNETT,
Commissioner.

The SECRETARY OF THE INTERIOR.

STATISTICS RELATING TO THE DISPOSITION OF THE PUBLIC DOMAIN.

Average number of employees of the General Land Office.

In General Land Office, Washington, D. C.	526
In 14 surveyors-general offices	193
In 103 district land offices	422
In the field	385
Total	1,526

United States district land offices June 30, 1909.

Location.	Established.	Opened.[a]
Alabama:		
Montgomery	July 10, 1832	[b]Jan. 1, 1834
Alaska:		
Fairbanks	May 14, 1907	July 1, 1907
Juneau	Apr. 2, 1902	June 20, 1902
Nome	May 14, 1907	July 1, 1907
Arizona:		
Phoenix	July 25, 1905	Oct. 2, 1905
Arkansas:		
Camden	Jan. 10, 1871	Mar. 20, 1871
Dardanelle[c]	July 14, 1870	May 31, 1871
Harrison	....do....	Feb. 27, 1871
Little Rock	Feb. 17, 1818	Sept. 1, 1821
California:		
Eureka	Mar. 29, 1858	July 24, 1858
Independence	Apr. 22, 1886	Mar. 22, 1887
Los Angeles	June 12, 1869	Sept. 22, 1869
Oakland[d]	Jan. 16, 1857	Nov. 3, 1857
Redding	May 13, 1890	July 15, 1890
Sacramento	July 26, 1866	Nov. 12, 1867
Susanville	Feb. 10, 1871	Mar. 2, 1871
Visalia	Mar. 29, 1858	July 10, 1858
Colorado:		
Del Norte	June 20, 1874	Mar. 22, 1875
Denver	June 4, 1864	Aug. 15, 1864
Durango	Apr. 20, 1882	Oct. 2, 1882
Glenwood Springs	July 3, 1884	Nov. 10, 1884
Hugo	Feb. 6, 1890	Sept. 7, 1890
Lamar	Aug. 4, 1886	Jan. 3, 1887
Leadville	Apr. 5, 1879	July 1, 1879
Montrose	Jan. 4, 1888	Sept. 1, 1888
Pueblo	May 27, 1870	Jan. 16, 1871
Sterling	Feb. 6, 1890	Aug. 1, 1890
Florida:		
Gainesville	June 8, 1872	Apr. 30, 1873
Idaho:		
Blackfoot	Sept. 3, 1886	Nov. 16, 1886
Boise	July 26, 1866	Jan. 13, 1868
Coeur d'Alene	July 14, 1884	Dec. 21, 1885
Hailey	Jan. 24, 1883	July 16, 1883
Lewiston	July 26, 1866	Sept. 26, 1871
Iowa:		
Des Moines	Aug. 2, 1852	Jan. 28, 1853
Kansas:		
Colby[e]	Dec. 20, 1893	Feb. 5, 1894
Dodge City	....do....	Feb. 7, 1894
Topeka	July 24, 1861	Sept. 10, 1861
Louisiana:		
Natchitoches	July 7, 1838	Oct. 12, 1838
New Orleans	Mar. 3, 1811	[b]Jan. 1, 1812
Michigan:		
Marquette	Mar. 19, 1857	July 14, 1857
Minnesota:		
Cass Lake	Apr. 1, 1903	July 1, 1903
Crookston	Apr. 29, 1878	May 5, 1879
Duluth	Mar. 27, 1862	Jan. 15, 1863
Mississippi:		
Jackson	June 23, 1836	July 25, 1836
Missouri:		
Springfield	June 26, 1834	Oct. 4, 1838
Montana:		
Billings	Feb. 5, 1906	July 2, 1906
Bozeman	June 20, 1874	Oct. 5, 1874
Glasgow	Feb. 25, 1907	June 1, 1907
Great Falls	May 8, 1902	Aug. 1, 1902
Helena	Mar. 2, 1867	Apr. 27, 1867
Kalispell	Mar. 2, 1897	July 1, 1897
Lewistown	Apr. 1, 1890	Nov. 26, 1890
Miles City	Apr. 30, 1880	Oct. 19, 1880
Missoula	Apr. 1, 1890	Apr. 20, 1891
Nebraska:		
Alliance	Apr. 16, 1890	July 1, 1890
Broken Bow	....do....	July 7, 1890
Lincoln	July 7, 1868	Sept. 7, 1868
North Platte	Apr. 22, 1872	Apr. 11, 1873
O'Neill	Apr. 7, 1888	July 16, 1888
Valentine	June 19, 1882	July 7, 1883
Nevada:		
Carson City	July 2, 1862	Mar. 1, 1864
New Mexico:		
Clayton	Dec. 18, 1888	Aug. 12, 1889
Las Cruces	Mar. 10, 1883	May 1, 1883
Roswell	Mar. 1, 1889	Dec. 9, 1889

[a] Where date of opening is not known, date of first entry made at the office is given.
[b] About.
[c] Closed January 30, 1909; business to Little Rock.
[d] Land office removed from San Francisco to Oakland May 1, 1906.
[e] Closed March 31, 1909; business to Topeka.

United States district land offices June 30, 1909—Continued.

Location.	Established.	Opened.
New Mexico—Con.		
Santa Fe	May 24, 1858	Nov. 24, 1858
Tucumcari	Mar. 16, 1908	July 1, 1908
North Dakota:		
Bismarck	Apr. 24, 1874	Oct. 12, 1874
Devils Lake	Mar. 3, 1883	Aug. 24, 1883
Dickinson	Mar. 16, 1904	July 1, 1904
Fargo	Dec. 29, 1873	Sept. 1, 1874
Minot	Sept. 26, 1890	Oct. 1, 1891
Williston	Apr. 26, 1906	Aug. 1, 1906
Oklahoma:		
El Reno	July 4, 1901	Aug. 6, 1901
Guthrie	Mar. 3, 1889	Apr. 22, 1889
Lawton	July 4, 1901	Aug. 6, 1901
Woodward	Aug. 25, 1893	Sept. 16, 1893
Oregon:		
Burns	June 1, 1889	Sept. 2, 1889
La Grande	July 3, 1866	Nov. 15, 1867
Lakeview	June 6, 1877	Aug. 6, 1877
Portland [a]	Aug. 24, 1854	Jan. 1, 1855
Roseburg	Sept. 15, 1859	Jan. 3, 1860
The Dalles	Jan. 11, 1875	June 1, 1875
South Dakota:		
Aberdeen	Mar. 23, 1882	Oct. 2, 1882
Chamberlain	Feb. 10, 1890	Apr. 3, 1890
South Dakota—Con.		
Gregory [b]	July 14, 1880	Jan. 3, 1882
Pierre	Feb. 10, 1890	May 12, 1890
Rapid City	Dec. 13, 1888	Jan. 15, 1889
Utah:		
Salt Lake City	July 16, 1868	Nov. 1, 1868
Vernal	May 9, 1905	July 1, 1905
Washington:		
North Yakima	Apr. 11, 1885	Apr. 24, 1885
Olympia	May 16, 1890	Oct. 1, 1890
Seattle	June 27, 1887	Dec. 3, 1887
Spokane	June 23, 1883	Oct. 1, 1883
Vancouver	May 16, 1860	July 3, 1861
Walla Walla	Mar. 3, 1871	July 17, 1871
Waterville	May 16, 1890	Nov. 6, 1890
Wisconsin:		
Wausau	June 19, 1872	Aug. 19, 1872
Wyoming:		
Buffalo	Mar. 3, 1887	May 1, 1888
Cheyenne	Feb. 5, 1870	Aug. 10, 1870
Douglas	Apr. 23, 1890	Nov. 1, 1890
Evanston	Aug. 9, 1876	Aug. 13, 1877
Lander	Apr. 23, 1890	Nov. 8, 1890
Sundance	Apr. 3, 1890	Oct. 27, 1890

[a] Land office removed from Oregon City to Portland July 1, 1905.
[b] Land office removed from Mitchell to Gregory March 15, ,1909.

NOTE.—By act of July 31, 1876, the land offices in Ohio, Indiana, and Illinois were abolished, and by act of March 3, 1877, the vacant tracts of public lands in Ohio, Indiana, and Illinois are made subject to entry and location at the General Land Office, Washington, D. C.

List of offices of United States surveyors-general.

Location.	Established.	Location.	Established.
Alaska: Juneau	May 17, 1884	Nevada: Reno	July 4, 1866
Arizona: Phoenix	Feb. 24, 1863	New Mexico: Santa Fe	Mar. 2, 1867
California: San Francisco	Mar. 3, 1851	Oregon: Portland	July 17, 1854
Colorado: Denver	Feb. 28, 1861	South Dakota: Huron	Apr. 10, 1890
Idaho: Boise	June 29, 1866	Utah: Salt Lake City	July 16, 1868
Louisiana: New Orleans [a]	Mar. 3, 1831	Washington: Olympia	July 17, 1854
Montana: Helena	July 2, 1864	Wyoming: Cheyenne	Feb. 5, 1870

[a] Closed July 1, 1909.

Field division headquarters of special agents of General Land Office.

Field division:	Field division—Continued.
1.....Portland, Oreg.	10.....Salt Lake City, Utah.
2.....San Francisco, Cal.	11.....Enid, Okla.
3.....Spokane, Wash.	12.....Santa Fe, N. Mex.
4.....Helena, Mont.	13.....Gainesville, Fla.
5.....Denver, Colo.	14.....Boise, Idaho.
6.....Phoenix, Ariz.	15.....Fargo, N. D.
7.....Cheyenne, Wyo.	16.....Huron, S. D.
8.....Duluth, Minn.	17.....Seattle, Wash.
9.....Little Rock, Ark.	

Area of States and Territories.

[Based upon careful joint calculations made in the General Land Office, the Geological Survey, and the Bureau of the Census.]

State or Territory.	Land surface.		Water surface.		Total areas.	
	Sq. m.	*Acres.*	*Sq. m.*	*Acres.*	*Sq. m.*	*Acres.*
Alabama	51,279	32,818,560	719	460,160	51,998	33,278,720
Arizona	113,840	72,857,600	116	74,240	113,956	72,931,840
Arkansas	52,525	33,616,000	810	518,400	53,335	34,134,400
California	156,092	99,898,880	2,205	1,411,200	158,297	101,310,080
Colorado	103,658	66,341,120	290	185,600	103,948	66,526,720
Connecticut	4,820	3,084,800	145	92,800	4,965	3,177,600
Delaware	1,965	1,257,600	405	259,200	2,370	1,516,800
District of Columbia	60	38,400	10	6,400	70	44,800
Florida	54,861	35,111,040	3,805	2,435,200	58,666	37,546,240
Georgia	58,725	37,584,000	540	345,600	59,265	37,929,600
Idaho	83,779	53,618,560	534	341,760	84,313	53,960,320
Illinois	56,002	35,841,280	663	424,320	56,665	36,265,600
Indiana	35,885	22,966,400	469	300,160	36,354	23,266,560
Iowa	55,586	35,575,040	561	359,040	56,147	35,934,080
Kansas	81,774	52,335,360	384	245,760	82,158	52,581,120
Kentucky	40,181	25,715,840	417	266,880	40,598	25,982,720
Louisiana	45,409	29,061,760	3,097	1,982,080	48,506	31,043,840
Maine	29,895	19,132,800	3,145	2,012,800	33,040	21,145,600
Maryland	9,941	6,362,240	2,386	1,527,040	12,327	7,889,280
Massachusetts	8,039	5,144,960	227	145,280	8,266	5,290,240
Michigan	57,480	36,787,200	500	320,000	57,980	37,107,200
Minnesota	80,858	51,749,120	3,824	2,447,360	84,682	54,196,480
Mississippi	46,362	29,671,680	503	321,920	46,865	29,993,600
Missouri	68,727	43,985,280	693	443,520	69,420	44,428,800
Montana	145,776	93,296,640	796	509,440	146,572	93,806,080
Nebraska	76,808	49,157,120	712	455,680	77,520	49,612,800
Nevada	109,821	70,285,440	869	556,160	110,690	70,841,600
New Hampshire	9,031	5,779,840	310	198,400	9,341	5,978,240
New Jersey	7,514	4,808,960	710	454,400	8,224	5,263,360
New Mexico	122,503	78,401,920	131	83,840	122,634	78,485,760
New York	47,654	30,498,560	1,550	992,000	49,204	31,490,560
North Carolina	48,740	31,193,600	3,686	2,359,040	52,426	33,552,640
North Dakota	70,183	44,917,120	654	418,560	70,837	45,335,680
Ohio	40,740	26,073,600	300	192,000	41,040	26,265,600
Oklahoma	69,414	44,424,960	643	411,520	70,057	44,836,480
Oregon	95,607	61,188,480	1,092	698,880	96,699	61,887,360
Pennsylvania	44,832	28,692,480	294	188,160	45,126	28,880,640
Rhode Island	1,067	682,880	181	115,840	1,248	798,720
South Carolina	30,495	19,516,800	494	316,160	30,989	19,832,960
South Dakota	76,868	49,195,520	747	478,080	77,615	49,673,600
Tennessee	41,687	26,679,680	335	214,400	42,022	26,894,080
Texas	262,398	167,934,720	3,498	2,238,720	265,896	170,173,440
Utah	82,184	52,597,760	2,806	1,795,840	84,990	54,393,600
Vermont	9,124	5,839,360	440	281,600	9,564	6,120,960
Virginia	40,262	25,767,680	2,365	1,513,600	42,627	27,281,280
Washington	66,836	42,775,040	2,291	1,466,240	69,127	44,241,280
West Virginia	24,022	15,374,080	148	94,720	24,170	15,468,800
Wisconsin	55,256	35,363,840	810	518,400	56,066	35,882,240
Wyoming	97,594	62,460,160	320	204,800	97,914	62,664,960
	2,974,159	1,903,461,760	52,630	33,683,200	3,026,789	1,937,144,960
Alaska					590,884	378,165,760
Guam					210	134,400
Hawaii					6,449	4,127,360
Panama Canal strip					474	303,360
Philippine Islands					115,026	73,616,640
Porto Rico					3,435	2,198,400
Tutuila Group, Samoa					77	49,280
Total					3,743,344	2,395,740,160

Owing to their location adjoining the Great Lakes, the States enumerated below contain approximately an additional number of square miles as follows: Illinois, 1,674 square miles of Lake Michigan; Indiana, 230 square miles of Lake Michigan; Michigan, 16,653 square miles of Lake Superior, 12,922 square miles of Lake Michigan, 9,925 square miles of Lake Huron, and 460 square miles of lakes St. Clair and Erie; Minnesota, 2,514 square miles of Lake Superior; New York, 3,140 square miles of lakes Ontario and Erie; Ohio, 3,443 square miles of Lake Erie; Pennsylvania, 891 square miles of Lake Erie; Wisconsin 2,378 square miles of Lake Superior and 7,500 square miles of Lake Michigan.

In addition to the water areas noted above, California claims jurisdiction over all Pacific waters lying within 3 English miles of her coast; Oregon claims jurisdiction over a similar strip of the Pacific Ocean 1 marine league in width between latitude 42° north and the mouth of the Columbia River; and Texas claims jurisdiction over a strip of Gulf water 3 leagues in width, adjacent to her coast and between the Rio Grande and the Sabine River.

Final homestead entries from the passage of the homestead act to June 30, 1909.

Fiscal year ended June 30—	Number.	Acres.	Fiscal year ended June 30—	Number.	Acres.
1868	2,772	355,086.04	1890	28,080	4,060,592.77
1869	3,965	504,301.97	1891	27,686	3,954,587.77
1870	4,041	519,727.84	1892	22,822	3,259,897.07
1871	5,087	629,162.25	1893	24,204	3,477,231.63
1872	5,917	707,409.83	1894	20,544	2,929,947.41
1873	10,311	1,224,890.93	1895	20,922	2,980,809.30
1874	14,129	1,585,781.56	1896	20,099	2,790,242.55
1875	18,293	2,068,537.74	1897	20,115	2,778,404.20
1876	22,530	2,590,552.81	1898	22,281	3,095,017.75
1877	19,900	2,407,828.19	1899	22,812	3,134,149.44
1878	22,460	2,662,980.82	1900	25,286	3,477,842.71
1879	17,391	2,070,842.39	1901	37,568	5,241,120.76
1880	15,441	1,938,234.89	1902	31,627	4,342,747.70
1881	15,077	1,928,204.76	1903	26,373	3,576,964.14
1882	17,174	2,219,453.80	1904	23,932	3,232,716.75
1883	18,998	2,504,414.51	1905	24,621	3,419,387.15
1884	21,843	2,945,574.72	1906	25,546	3,526,748.58
1885	22,066	3,032,679.11	1907	26,485	3,740,567.71
1886	19,356	2,663,531.83	1908	29,636	4,242,710.59
1887	19,866	2,749,037.48	1909	25,510	3,699,466.79
1888	22,413	3,175,400.64			
1889	25,549	3,681,708.80	Total	850,728	115,124,295.68

Timber and stone entries from the passage of the act of June 3, 1878, to June 30, 1909.

State or Territory.	Number of entries.	Acres.	Amount received.	State or Territory.	Number of entries.	Acres.	Amount received.
Alabama	163	13,750.52	$34,928.02	Nebraska	1	97.20	$243.00
Arizona	3	200.00	500.00	Nevada	49	6,222.32	15,558.19
Arkansas	2,036	223,827.84	560,828.10	North Dakota	75	7,936.20	19,840.50
California	19,204	2,717,010.13	6,792,305.03	Oklahoma	1	40.00	100.00
Colorado	2,612	325,399.72	809,610.23	Oregon	24,830	3,566,905.45	8,909,220.79
Florida	688	79,553.17	198,835.32	South Dakota	459	52,020.45	129,864.06
Idaho	6,984	944,478.26	2,378,928.08	Utah	11	1,121.07	2,802.68
Iowa	3	119.36	298.40	Washington	15,473	2,070,563.38	5,175,603.61
Louisiana	1,518	135,117.67	337,732.41	Wisconsin	1,043	76,609.36	191,524.90
Michigan	1,517	127,158.90	317,892.82	Wyoming	3,028	344,461.95	861,871.07
Minnesota	10,327	1,275,221.73	3,191,237.63				
Mississippi	75	5,345.27	13,363.37	Total	94,552	12,556,015.06	31,400,133.29
Montana	4,452	582,855.11	1,457,045.08				

Desert-land entries from the passage of the act of March 3, 1877, to June 30, 1909.

State or Territory.	Entries.		Area.		Amount.		Total.
	Original.	Final.	Original.	Final.	Original.	Final.	
			Acres.	*Acres.*			
Arizona	4,401	810	1,287,202.80	240,911.08	$369,874.59	$232,383.85	$602,258.44
California	10,085	1,819	2,442,717.81	406,088.59	625,637.91	429,100.42	1,054,738.33
Colorado	9,419	1,306	1,798,454.87	2 2,235.47	450,183.41	222,079.14	672,262.55
Dakota Territory	35	1	20,021.00	300.00	5,005.25	300.00	5,305.25
Idaho	11,006	3,342	2,036,625.35	600,541.34	509,019.76	599,286.52	1,108,306.28
Montana	21,779	9,239	4,306,006.40	1,795,214.02	1,084,448.07	1,806,041.78	2,890,489.85
Nevada	889	165	226,891.52	41,820.18	56,956.10	41,832.70	98,788.80
New Mexico	7,523	961	1,514,859.84	233,565.51	380,566.45	233,218.16	613,784.61
North Dakota	508	92	83,982.21	15,513.55	20,995.76	15,578.29	36,574.05
Oregon	3,873	909	673,784.38	161,113.49	168,512.06	161,107.32	329,619.38
South Dakota	2,234	179	367,921.74	34,691.55	91,954.98	34,691.58	126,646.56
Utah	6,010	1,593	1,099,711.23	267,888.30	281,720.14	273,781.50	555,501.64
Washington	3,317	352	594,454.34	48,737.26	159,843.77	52,486.74	212,330.51
Wyoming	13,143	4,548	3,086,885.07	1,080,925.94	778,712.27	1,089,687.65	1,868,399.92
Total	94,222	25,316	19,539,518.56	5,149,546.28	4,983,430.52	5,191,575.65	10,175,006.17

Timber-culture entries from the passage of the act of March 3, 1873, to June 30, 1909.

State or Territory.	Entries.			Area.			Amount.			
	Original.	Final.	Commuted.	Original.	Final.	Commuted.	Fees (original).	Fees (final).	Purchase money.	Total.
				Acres.	*Acres.*	*Acres.*				
Arizona	1,152	52	74	164,806.63	7,149.14	10,223.42	$15,224.00	$208.00	$12,779.26	$28,211.26
Arkansas	41	4	1	4,817.14	480.00	40.00	489.00	16.00	44.00	549.00
California	8,264	480	567	1,163,922.03	63,411.58	78,728.76	110,014.00	1,904.00	98,499.13	210,417.13
Colorado	27,864	3,789	660	4,332,922.19	585,243.30	98,179.52	384,938.00	15,154.00	122,722.36	522,814.36
Dakota Territory	77,446	1,309	.....	12,055,642.98	185,467.24	.....	1,074,862.44	4,984.79	.....	1,079,847.23
Florida	3	.....	.....	480.00	.....	.....	42.00	.....	.....	42.00
Idaho	4,054	341	236	533,957.49	40,436.03	28,244.51	51,447.38	1,369.50	35,305.93	88,122.81
Iowa	1,044	390	39	81,378.95	31,987.87	2,292.17	11,838.83	1,560.00	2,965.22	16,364.05
Kansas	64,345	12,886	961	9,702,653.36	2,005,831.35	142,931.88	883,275.56	51,529.03	178,650.55	1,113,455.14
Louisiana	713	87	42	101,695.31	11,937.97	5,856.85	9,651.55	348.00	7,299.54	17,299.09
Minnesota	15,268	2,924	389	2,099,046.55	373,580.90	40,261.29	207,154.98	11,712.00	61,543.77	280,410.75
Montana	3,595	407	225	486,638.66	56,019.73	29,044.43	46,162.00	1,632.00	36,506.32	84,300.32
Nebraska	59,127	16,870	1,250	8,876,351.20	2,546,696.04	187,371.35	813,382.33	67,776.73	234,332.61	1,115,491.67
Nevada	46	1	.....	6,292.50	160.00	.....	614.00	4.00	.....	618.00
New Mexico	1,612	91	55	230,316.54	12,931.60	7,837.25	21,294.00	363.00	9,796.56	31,453.56
North Dakota	1,699	7,897	781	263,123.95	1,226,605.66	120,524.80	23,446.00	31,576.83	150,661.75	205,684.58
Oregon	7,126	1,499	252	1,051,235.21	224,056.67	35,902.61	95,821.00	6,016.00	44,878.37	146,715.37
South Dakota	2,925	13,764	821	449,583.61	2,124,753.58	121,730.98	40,151.00	55,036.00	152,082.89	247,269.89
Utah	1,476	138	89	179,690.74	15,556.26	10,157.44	17,925.00	552.00	12,696.85	31,173.85
Washington	9,354	2,004	538	1,362,193.51	292,447.52	75,689.54	125,615.00	8,012.00	94,770.83	228,397.83
Wisconsin	1	1	.....	40.00	40.00	.....	9.00	4.00	.....	13.00
Wyoming	3,123	332	125	459,556.42	50,383.08	15,288.29	41,904.00	1,328.00	19,135.91	62,367.91
Total	290,278	65,266	7,105	43,606,344.97	9,855,175.52	1,010,305.09	3,975,261.07	261,085.88	1,274,671.85	5,511,018.80

Coal-land entries from the passage of the act of March 3, 1873, to June 30, 1909.

State or Territory.	Entries.	Acres.	Amount.	State or Territory.	Entries.	Acres.	Amount.
Alabama	2	239.40	$2,394.00	New Mexico	188	21,749.93	$335,111.60
Alaska	82	12,284.62	122,846.35	North Dakota	109	6,658.96	105,975.00
Arizona	5	800.00	16,000.00	Oregon	51	8,203.33	87,740.30
California	36	4,907.96	72,060.30	South Dakota	9	713.74	6,737.40
Colorado	1,003	151,964.50	2,088,001.05	Utah	330	47,767.83	836,313.75
Colorado [a]	433	56,786.77	840,838.90	Washington	352	54,702.48	848,305.40
Dakota [b]	8	583.57	5,835.70	Wyoming	642	94,380.11	1,553,442.45
Idaho	2	280.00	2,800.00				
Montana	302	43,256.46	743,590.50	Total	3,558	505,919.66	7,675,992.70
Nevada	4	640.00	8,000.00				

[a] Within the Ute Indian Reservation. [b] Territory.

Land concessions, by acts of Congress, to States and corporations for railroad and military wagon-road purposes from the year 1850 to June 30, 1909.

STATE GRANTS.

	Acres.
Illinois:	
Illinois Central	2,595,133.00
Mississippi:	
Mobile and Ohio River	[a] 737,130.29
Vicksburg and Meridian	199,101.51
Gulf and Ship Island	139,113.22
	1,075,345.02
Alabama:	
Mobile and Ohio River	[a] 419,528.44
Alabama and Florida	399,022.84
Selma, Rome and Dalton	458,555.82
Coosa and Tennessee	67,784.96
Mobile and Girard	[b] 302,181.16
Alabama and Chattanooga	653,888.76
South and North Alabama	445,438.43
	2,746,400.41
Florida:	
Florida Central and Peninsular	721,693.71
Florida and Alabama	166,691.08
Pensacola and Georgia	1,279,236.70
Florida, Atlantic and Gulf Central	29,384.18
	2,197,005.67
Louisiana:	
Vicksburg, Shreveport and Pacific	463,746.78
New Orleans, Opelousas and Great Western	[c]
	463,746.78
Arkansas:	
St. Louis, Iron Mountain and Southern	1,325,275.46
Little Rock and Fort Smith	1,052,082.51
Memphis and Little Rock	184,657.33
	2,562,015.30

[a] In the adjustment of this grant the road was treated as an entirety and without reference to the state line; hence Alabama has had approved to her more and Mississippi less than they would appear to be entitled to in proportion to the length of the road in the respective States.

[b] This grant was adjusted April 24, 1893, and 302,181.16 acres were allotted to the company. The balance of the previously certified lands were ordered restored to entry under the forfeiture act of September 29, 1890.

[c] Certified lands, footing 719,189.79 acres, were reconveyed to the United States by the governor of Louisiana February 24, 1888, the grant having been forfeited by act of July 14, 1870 (16 Stat., 277).

	Acres.
Missouri:	
Southwest branch of the Pacific road	1,161,284.51
Hannibal and St. Joseph	611,323.35
St. Louis, Iron Mountain and Southern	65,120.31
	1,837,728.17
Iowa:	
Burlington and Missouri River	389,990.11
Chicago, Rock Island and Pacific	[a] 483,214.36
	161,532.81
Cedar Rapids and Missouri River	[a] 922,813.67
	244,022.96
Dubuque and Sioux City	[a] 556,406.74
Iowa Falls and Sioux City	683,057.34
Des Moines Valley	840,091.36
Chicago, Milwaukee and St. Paul	326,216.10
McGregor and Missouri River	
Sioux City and St. Paul	322,412.81
	4,929,758.26
Michigan:	
Port Huron and Lake Michigan	37,467.44
Jackson, Lansing and Saginaw	743,787.58
Grand Rapids and Indiana	852,521.10
Flint and Pere Marquette	512,877.03
Marquette, Houghton and Ontonagon	[b] 305,929.59
Ontonagon and Brule River	34,227.08
Bay de Noquet and Marquette	128,301.05
Chicago and Northwestern	518,065.36
	3,133,176.23
Wisconsin:	
Chicago, St. Paul, Minneapolis and Omaha (formerly West Wisconsin)	813,706.71
Wisconsin Railroad Farm Mortgage Land Co	163,159.65
Chicago, St. Paul, Minneapolis and Omaha (formerly St. Croix and Lake Superior)	816,487.76
Branch to Bayfield	471,721.14
Chicago and Northwestern	546,446.20
Wisconsin Central	838,227.69
	3,649,749.15
Minnesota:	
St. Paul, Minneapolis and Manitoba (main and branch lines) [c]	3,249,575.07
Minnesota Central	179,734.29
Winona and St. Peter	1,680,974.92
St. Paul and Sioux City	1,126,578.55
St. Paul and Duluth	860,973.62
Southern Minnesota, from a point on the Mississippi River to Houston	546,564.69
Southern Minnesota extension (now Chicago, Milwaukee and St. Paul)	
Hastings and Dakota	377,696.15
	8,022,097.29
Minnesota, North Dakota, Montana, Washington:	
St. Paul, Minneapolis and Manitoba (main and branch), a special act (Aug. 5, 1892, 27 Stat. L., 390) to provide for indemnity for lands relinquished by the company	[d] 39,762.97

[a] Includes 35,685.49 acres of the Chicago, Rock Island and Pacific Railroad, 109,756.85 acres of the Cedar Rapids and Missouri River Railroad, and 77,535.22 acres of the Dubuque and Sioux City Railroad, situated in the old Des Moines River grant of August 8, 1846, which should be deducted from the foregoing amount. (Wolcott *v.* Des Moines Co., 5 Wall., 631.)

[b] Excess of 131,481.71 acres originally certified under this grant reconveyed by State or entered under act March 3, 1887, by Michigan Land and Iron Co., Ltd., grant having been forfeited in part by act March 2, 1889 (25 Stat., 1008).

[c] Declared to be one grant. See 32 L. D., 21.

[d] See Minnesota for original grants.

	Acres.
Kansas:	
Leavenworth, Lawrence and Galveston	[a] 249,446.13
Missouri, Kansas and Texas	[b] 976,593.22
Atchison, Topeka and Santa Fe	2,944,788.14
St. Joseph and Denver City	462,933.24
	4,633,760.73
Grand total of State grants	37,885,678.98

WAGON ROADS.

From Lake Erie to Connecticut Western Reserve	80,773.54
From Lake Michigan to Ohio River	170,580.24
From Fort Wilkins, Copper Harbor, Mich., to Greenbay, Wis	302,930.96
From Fort Wilkins, Copper Harbor, to Wisconsin state line	221,013.35
Oregon Central Military Co. (now California and Oregon Land Co.)	582,191.61
Corvallis and Yaquina Bay	81,895.25
Willamette Valley and Cascade Mountain	861,511.86
Dalles military road	556,827.04
Coos Bay military road	105,240.11
Grand total	2,962,963.96

Patented to corporations, by States and Territories, up to June 30, 1909.

Arizona: Atlantic and Pacific	2,442,165.17
Arkansas: Atlantic and Pacific (successor to St. Louis and San Francisco)	23,249.94
California:	
Central Pacific	874,877.52
Central Pacific (successor to Western Pacific)	458,147.97
Central Pacific (successor to California and Oregon)	3,154,868.49
Southern Pacific (main line)	3,478,136.44
Southern Pacific (branch line)	1,258,437.96
Colorado:	
Union Pacific	596,502.75
Union Pacific (successor to Denver Pacific)	807,564.76
Union Pacific (successor to Kansas Pacific)	2,338,556.73
Kansas:	
Union Pacific (successor to Kansas Pacific)	3,837,103.90
Central Branch Union Pacific	220,520.47
Iowa: Sioux City and Pacific (now Missouri Valley Land Co.)	4,383.11
Idaho:	
Northern Pacific	825,492.08
Central Pacific	9,545.59
Louisiana: New Orleans Pacific	1,001,017.33
Minnesota: Northern Pacific	1,872,942.47
Missouri: Atlantic and Pacific (successor to St. Louis and San Francisco)	490,105.87
Montana: Northern Pacific	9,630,035.74
Nevada: Central Pacific	3,571,908.83
New Mexico: Atlantic and Pacific	1,246,086.53
North Dakota: Northern Pacific	10,599,992.08
Nebraska:	
Sioux City and Pacific	38,227.84
Burlington and Missouri River	2,374,090.77
Union Pacific	4,857,422.79
Central Branch Union Pacific	2,560.03
Oregon:	
Northern Pacific	536,341.66
Oregon and California	2,765,677.10
Oregon Central	126,908.02

[a] Includes 186,936.72 acres of the "Osage ceded reservation," which are to be deducted from the above amount under the decision of the Supreme Court in the case of The Leavenworth, Lawrence and Galveston Railroad *v.* The United States (92 U. S., 733).

[b] Includes 270,970.78 acres in the "Osage ceded reservation," which are to be deducted under the decision cited in note [a].

	Acres.
Utah:	
Union Pacific	813,344.26
Central Pacific	1,283,902.70
Washington:	
Northern Pacific	8,755,847.88
Oregon Central	1,710.11
Wisconsin: Northern Pacific	9,950.82
Wyoming:	
Union Pacific	5,663,296.33
Northern Pacific	51,914.17
Total	76,026,775.51

Summary of grants for railroads and wagon roads.

Railroad grants:	
Corporations	76,026,775.51
States	37,885,678.98
Total	113,912,454.49
Wagon-road grants	2,962,963.96
Total wagon-road and railroad grants patented up to June 30, 1909	116,875,418.45

State desert-land segregations, act of August 18, 1894, and amendatory acts, commonly known as the Carey Act, to June 30, 1909.

State.	Applied for.	Segregated.	Canceled.	Patented.	Pending June 30, 1909.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Colorado	104,870.06	88,964.23	5,985.06	.....	9,920.77
Idaho	1,749,990.20	1,143,030.22	275,734.92	157,034.90	356,631.62
Montana	346,937.11	102,275.34	5,072.53	18,296.91	[a]242,349.13
Nebraska	36,288.40	.....	8,760.00	.....	27,528.40
Oregon	435,841.93	295,583.55	140,491.28	50,303.13	.....
Utah	331,327.40	91,346.57	239,980.83	.....	.....
Washington	155,649.39	.....	155,649.39	.....	.....
Wyoming	1,037,092.29	936,288.28	148,971.36	72,030.45	[b]33,505.49
Total	4,197,996.78	2,657,488.19	980,645.37	297,665.39	669,935.41

[a] Time to reclaim 52,513.45 acres extended. [b] Time to reclaim 27,397.53 acres extended.

Public and Indian lands entered each year ended June 30, from 1903 to 1909, inclusive.

State or Territory.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Alabama	118,015.48	95,338.63	97,561.08	102,621.51	92,530.30	81,228.56	50,930.86
Alaska	1,723.37	1,770.65	2,973.11	4,925.86	7,132.16	3,834.80	10,772.33
Arizona	142,775.78	234,085.06	151,340.84	107,054.87	86,121.64	198,509.64	468,160.64
Arkansas	425,695.34	516,964.53	416,583.11	441,530.07	496,015.40	333,676.41	171,316.50
California	957,507.84	986,253.31	1,032,758.32	809,811.28	579,294.93	766,932.98	1,290,579.46
Colorado	1,620,391.95	1,679,617.79	621,100.25	1,597,010.38	2,483,666.69	2,127,661.99	1,983,078.58
Florida	2,996,591.76	286,095.63	326,579.30	166,053.73	109,663.03	83,072.78	125,744.65
Idaho	700,472.55	855,754.73	609,568.10	734,763.70	1,162,745.25	1,087,402.94	1,383,443.88
Illinois	303.07	4.90	40.00	40.00	296.30	40.00	.....
Indiana	20.97	.....	9.30	.....	129.70	10.08	40.00
Iowa	903.02	952.39	1,010.84	957.93	195.65	1,433.69	564.04
Kansas	457,529.18	268,627.46	273,100.34	669,438.67	611,726.97	332,931.81	166,375.14
Louisiana	188,457.17	95,324.72	269,200.68	80,086.61	89,608.79	59,450.26	39,428.40
Michigan	59,689.43	47,580.07	41,519.50	38,669.10	42,828.40	46,147.59	33,813.58
Minnesota	933,845.87	1,098,763.74	835,314.29	397,567.07	324,418.22	429,351.12	385,816.56
Mississippi	119,124.82	82,201.70	77,034.04	75,856.78	55,645.26	35,545.37	35,908.88
Missouri	98,080.95	117,304.56	104,096.72	101,426.89	154,871.72	129,157.20	53,560.91
Montana	1,533,205.29	1,052,994.63	1,086,290.05	1,782,279.90	1,218,780.97	1,494,052.02	2,460,905.55
Nebraska	503,531.32	1,318,931.13	4,792,351.65	1,736,964.79	1,785,762.47	1,781,823.80	1,979,872.10
Nevada	206,643.67	216,468.06	88,563.48	278,904.38	47,254.63	60,131.50	78,190.07
New Jersey	.....	.....	.....	90.03	.....	.....	.....
New Mexico	886,276.60	601,360.93	603,264.07	1,235,059.38	2,758,006.91	2,850,337.11	2,542,799.18
North Dakota	2,935,112.18	1,798,551.95	1,679,722.76	3,325,828.23	2,256,423.56	1,383,957.19	877,649.71

Public and Indian lands entered each year ended June 30—Continued.

State or Territory.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Ohio	45.00						
Oklahoma	1,544,317.90	1,394,227.56	770,225.35	1,426,306.46	2,007,753.84	514,159.58	297,572.30
Oregon	1,926,395.13	1,172,415.14	769,480.58	617,293.21	951,481.34	1,021,001.29	1,091,530.56
South Dakota	755,853.40	823,240.29	1,028,149.12	1,707,684.39	1,502,411.24	2,086,171.82	2,219,560.32
Utah	165,006.03	133,503.01	185.517.13	413,030.21	334,827.36	469,311.88	619,802.07
Washington	1,418,319.48	961,822.89	773,541.23	989,907.66	911,327.34	825,813.57	608,546.35
Wisconsin	113,766.27	89,949.98	72,012.71	55,592.44	28,966.92	57,595.61	19,061.18
Wyoming	2,014,698.83	402,192.24	347,714.32	534,431.94	897,679.59	829,614.19	897,479.96
Total	22,824,299.65	16,332,297.68	17,056,622.27	19,431,187.47	20,997,566.58	19,090,356.78	19,892,503.76

Unappropriated lands on June 30, 1909.

[A circular showing areas unappropriated, by counties, has been published and is distributed on request.]

State or Territory.	Surveyed.	Unsurveyed.	Total.	State or Territory.	Surveyed.	Unsurveyed.	Total.
	Acres.	*Acres.*	*Acres.*		*Acres.*	*Acres.*	*Acres.*
Alabama	106,220		106,220	Montana	20,385,086	22,515,143	42,900,229
Alaska		368,016,038	368,016,038	Nebraska	2,341,686		2,341,686
Arizona	12,733,464	29,620,974	42,354,438	Nevada	29,931,952	26,768,919	56,700,871
Arkansas	1,098,364		1,098,364	New Mexico	27,038,153	11,774,737	38,812,890
California	21,314,771	7,300,160	28,614,931	North Dakota	1,844,937	66,120	1,911,057
Colorado	22,164,343	2,551,704	24,716,047	Oklahoma	35,687		35,687
Florida	436,036	61,648	497,684	Oregon	13,620,130	4,605,564	18,225,694
Idaho	6,430,665	16,689,138	23,119,803	South Dakota	4,921,121	130,845	5,051,966
Kansas	138,239		138,239	Utah	11,982,148	24,414,266	36,396,414
Louisiana	88,957		88,957	Washington	1,205,217	1,993,428	3,198,645
Michigan	123,038		123,038	Wisconsin	12,750		12,750
Minnesota	1,263,955	187,000	1,450,955	Wyoming	33,459,656	1,930,614	35,390,270
Mississippi	38,608		38,608				
Missouri	12,600		12,600	Total	212,727,783	518,626,298	731,354,081

Public lands surveyed during fiscal year ended June 30, 1909, and remaining unsurveyed.

State.	Land area.	Surveyed.	Unsurveyed.	State.	Land area.	Surveyed.	Unsurveyed.
	Acres.	*Acres.*	*Acres.*		*Acres.*	*Acres.*	*Acres.*
Alaska	378,165,760	1,235	378,150,495	New Mexico	78,401,920	262,849	25,604,790
Arizona	72,857,600	300,401	52,209,903	North Dakota	44,917,120	330,096	2,408,951
California	99,898,880	594,272	21,797,705	South Dakota	49,195,520	81,095	356,674
Colorado	66,341,120	831,345	1,136,143	Oregon	61,188,480	254,293	12,363,291
Florida	35,111,040	12	4,198,469	Utah	52,597,760	938,959	26,900,620
Idaho	53,618,560	1,270,520	28,583,884	Washington	42,775,040	970,247	11,210,542
Louisiana	29,061,760			Wyoming	62,460,160	591,956	3,725,356
Minnesota	51,749,120	80,368	2,291,935				
Montana	93,296,640	3,231,920	41,503,238	Total	1,341,921,920	9,749,477	643,405,843
Nevada	70,285,440	9,909	30,953,847				

Estimated area of existing national forests June 30, 1909.

	Acres.		Acres.
Alaska	26,761,626	Nevada	5,109,415
Arizona	[a] 15,258,861	New Mexico	[d] 10,971,711
Arkansas	3,189,781	North Dakota	13,940
California	[b] 27,968,510	Oklahoma	60,800
Colorado	15,698,439	Oregon	16,221,368
Florida	674,891	Porto Rico	65,950
Idaho	[c] 20,099,029	South Dakota	1,294,440
Kansas	302,387	Utah	7,436,327
Michigan	163,373	Washington	12,065,500
Minnesota	1,204,486	Wyoming	8,998,723
Montana	20,389,696		
Nebraska	556,072	Total area	194,505,325

[a] 1,450,061 acres thereof in existing Indian reservations.
[b] 109,960 acres thereof in existing Indian reservations.
[c] 237,398 acres difference in Idaho total from that of June 30, caused by reestimate of Pend Oreille area.
[d] 951,384 acres thereof in existing Indian reservations.

	Acres.
Area embraced in national forests established during year	3,655,231
Area embraced in additions to national forests during year	23,552,950
Area embraced in eliminations from national forests during year and difference in Idaho total of June 30, 1908	679,742
Area embraced in temporary withdrawals June 30, 1909	7,869,023
Estimated area in existing national forests June 30, 1908	167,976,886
Estimated area in existing national forests June 30, 1909	194,505,325

National monuments.

State and name.	Date created.	Area.	State and name.	Date created.	Area.
Arizona:		*Acres.*	Montana:		*Acres.*
Grand Canyon[a]	Jan. 11, 1908	806,400.00	Lewis and Clark	May 11, 1908	160.00
Montezuma Castle	Dec. 8, 1906	160.00	New Mexico:		
Navajo	Mar. 20, 1909		Chaco Canyon	May 6, 1907	20,629.40
Petrified Forest	Dec. 8, 1906	6,776.02	El Morro	Dec. 8, 1906	160.00
Tonto[a]	Dec. 19, 1907	640.00	Gila Cliff Dwellings[a]	Nov. 16, 1907	160.00
Tumacacori	Sept. 15, 1908	10.00	South Dakota:		
California:			Jewel Cave[a]	Feb. 7, 1908	1,280.00
Cinder Cone[a]	May 6, 1907	5,120.00	Utah:		
Lassen Peak[a]	do	1,280.00	Natural Bridges	Apr. 16, 1908	
Muir Woods	Jan 9, 1908	295.00	Washington:		
Pinnacles[a]	Jan. 16, 1908	2,080.00	Mount Olympus[a]	Mar. 2, 1909	
Colorado:			Wyoming:		
Wheeler[a]	Dec. 7, 1908	300.00	Devils Tower	Sept. 24, 1906	1,152.91

[a] Under jurisdiction of Department of Agriculture.

Aggregate cash receipts from the disposal of public and Indian lands from May 20, 1785, to June 30, 1909.

Fiscal year.	Cash sales.	Amount of fees and commissions.	Total receipts from disposal of public lands.	Receipts from sales of Indian lands.	Miscellaneous receipts.	Aggregate receipts from all sources.
May 20, 1785, to June 30, 1880						$208,059,657.14
1881	$3,534,550.98	$860,833.65	$4,395,384.63	$1,006,691.63	$6,727.90	5,408,804.16
1882	6,628,775.92	1,124,531.15	7,753,307.07	634,617.22	6,591.75	8,394,516.04
1883	9,657,032.28	1,423,329.10	11,080,361.38	625,404.27	8,118.05	11,713,883.70
1884	10,304,582.49	1,536,410.58	11,840,993.07	938,137.26	10,274.76	12,789,405.09
1885	6,223,926.74	1,462,188.06	7,686,114.80	933,483.52	8,821.86	8,628,420.18
1886	5,757,891.06	1,654,876.25	7,412,767.31	1,607,729.63	10,587.40	9,031,084.34
1887	9,246,321.33	1,537,600.39	10,783,921.72	1,484,302.30	20,784.85	12,289,008.87
1888	11,203,071.95	1,498,000.05	12,701,072.00	821,113.77	24,951.65	13,547,137.42
1889	8,018,254.50	1,251,971.23	9,270,225.73	389,524.72	26,150.89	9,685,901.34
1890	6,349,174.24	1,121,696.07	7,470,870.31	293,062.30	16,585.00	7,780,517.61
1891	4,160,099.07	944,938.65	5,105,037.72	318,333.42	5,849.00	5,429,220.14
1892	3,322,865.01	1,064,805.26	4,387,670.27	456,681.84	15,757.58	4,860,109.69
1893	3,193,280.64	998,184.65	4,191,465.29	284,752.65	3,516.20	4,479,734.14
1894	1,653,080.71	1,021,205.08	2,674,285.79	91,981.03	1,557.50	2,767,824.32
1895	1,116,090.07	750,710.59	1,866,800.66	149,879.48	16,773.89	2,033,454.03
1896	1,053,905.59	793,557.82	1,847,463.41	214,700.42	44,197.84	2,106,361.67
1897	917,911.19	678,469.55	1,596,380.74	438,716.31	52,834.23	2,087,931.28
1898	1,291,076.10	853,265.50	2,144,341.60	100,317.49	33,336.09	2,277,995.18
1899	1,703,988.32	890,702.17	2,594,690.49	442,913.73	32,533.12	3,070,137.34
1900	2,899,731.83	1,157,081.03	4,056,812.86	239,769.39	83,175.85	4,379,758.10
1901	2,966,542.86	1,340,894.29	4,307,437.15	585,661.27	79,062.37	4,972,160.79
1902	4,139,268.47	1,740,820.18	5,880,088.65	288,666.68	93,171.85	6,261,927.18
1903	8,960,471.18	1,597,147.48	10,557,618.66	308,939.14	158,185.85	11,024,743.65
1904	7,445,902.84	1,349,990.89	8,795,893.73	333,757.62	153,690.63	9,283,341.98
1905	4,849,766.06	1,286,621.93	6,136,387.88	791,807.67	89,615.72	7,017,811.38
1906	4,885,988.82	1,642,488.56	6,528,477.38	967,532.50	89,514.02	7,585,523.90
1907	7,728,114.30	1,819,159.21	9,547,273.51	1,892,805.70	113,098.79	11,553,178.00
1908	9,760,570.19	1,731,883.57	11,492,453.76	997,972.52	225,283.18	12,715,709.46
1909	7,698,337.03	1,536,890.67	9,235,227.70	2,334,885.47	330,136.61	12,216,415.39
Total						423,451,673.51

Amounts accrued and paid to States for educational purposes on account of grants of 2, 3, and 5 per cent of net proceeds of sales of public lands.

State.	Total to June 30, 1907.	Fiscal year 1908.	Aggregate to June 30, 1908, inclusive.
Alabama	$1,074,198.00	$539.70	$1,074,737.70
Arkansas	299,810.45	14,171.55	313,982.00
California	990,044.90	25,096.61	1,015,141.51
Colorado	370,794.70	19,224.40	390,019.10
Florida	125,817.74	2,849.49	128,667.23
Idaho	174,014.05	21,717.08	195,731.13
Illinois	1,187,908.89	.....	1,187,908.89
Indiana	1,040,255.26	.....	1,040,255.26
Iowa	633,638.10	.....	633,638.10
Kansas	1,098,998.55	5,864.64	1,104,863.19
Louisiana	462,256.45	3,534.13	465,790.58
Michigan	582,757.07	1,983.64	584,740.71
Minnesota	537,259.43	20,361.74	557,621.17
Mississippi	1,069,536.62	307.29	1,069,843.91
Missouri	1,050,393.35	5,318.16	1,055,711.51
Montana	250,271.23	25,309.56	275,580.79
Nebraska	532,612.80	3,000.39	535,613.19
Nevada	17,235.72	2,620.67	19,856.39
New Mexico	31,476.49	15,073.68	46,550.17
North Dakota	290,355.01	88,383.51	378,738.52
Ohio	999,353.01	.....	999,353.01
Oklahoma	.....	14,629.49	14,629.49
Oregon	567,354.80	66,870.49	634,225.29
South Dakota	108,843.38	29,027.64	137,871.02
Utah	36,525.53	7,032.62	43,558.15
Washington	310,528.02	37,869.32	348,397.34
Wisconsin	584,880.58	810.36	585,690.94
Wyoming	115,624.44	26,043.10	141,667.54
Total	14,542,744.57	437,639.26	14,980,383.83

Amounts covered into the Treasury to the credit of the reclamation fund from the sales of public lands and fees and commissions in the several States and Territories under the act of June 17, 1902 (32 Stat. L., 388).

State or Territory.	Fiscal years—		Total for eight years ending June 30, 1908.
	1901 to 1907.	1908.	
Arizona	$370,015.97	$65,910.01	$435,925.98
California	2,928,372.89	525,406.25	3,453,779.14
Colorado	3,117,322.08	701,793.05	3,819,115.13
Idaho	3,000,565.17	492,867.32	3,493,432.49
Kansas	304,182.98	148,304.07	452,487.05
Montana	3,373,876.88	595,628.36	3,969,505.24
Nebraska	820,087.42	109,263.83	929,351.25
Nevada	145,926.61	57,447.68	203,374.29
New Mexico	1,106,222.04	542,892.32	1,649,114.36
North Dakota	6,475,243.06	1,907,901.53	8,383,144.59
Oklahoma	4,172,693.35	579,702.92	4,752,396.27
Oregon	6,780,408.44	1,394,283.89	8,174,692.33
South Dakota	1,808,252.10	756,804.56	2,565,056.66
Utah	617,827.59	151,941.03	769,768.62
Washington	4,245,294.19	835,990.08	5,081,284.27
Wyoming	1,890,285.46	550,739.05	2,441,024.51
Total	41,156,576.23	9,416,875.95	50,573,452.18

Amount of collections from reclamation water-right charges, etc., during the fiscal years ended June 30, 1908 and 1909.

[No water-right charges collected prior to July 1, 1907.]

State.	Land office.	Receipts.	
		1908.	1909.
Idaho	Hailey	$5,706.18	$7,703.66
Montana	Billings	38,431.85	15,999.45
	Great Falls	1,631.00	18,944.52
	Miles City		199.50
Nebraska	Alliance		4,767.47
Nevada	Carson City	8,447.95	15,926.02
New Mexico	Roswell		7,626.75
North Dakota	Williston	423.00	555.50
Oregon	Lakeview		7,150.48
	La Grande	350.00	6,114.60
South Dakota	Rapid City		6,969.26
Washington	North Yakima		11,316.82
	Waterville		3,375.20
Wyoming	Cheyenne		14.00
	Lander	8,412.53	52,827.70
Total		63,402.51	159,490.93
Total to June 30, 1909		222,893.44	

Entries examined in General Land Office during fiscal year ended June 30, 1909.

Kind of entry.	Pending June 30, 1908.	Received.	Total.	Approved.	Canceled.	Otherwise disposed of.	Total.	Pending June 30, 1909.
Homesteads:								
Original	283,919	80,319	364,238	.....	16,276	42,039	58,315	305,923
Final	6,740	25,627	32,367	21,632	81	22	21,735	10,632
Commuted	5,077	21,277	26,354	18,223	55	21	18,299	8,055
Soldiers' additional	1,520	341	1,861	321	175	.....	496	1,365
Timber and stone	3,032	6,007	9,039	7,987	17	.....	8,004	1,035
Desert land:								
Original	25,390	5,499	30,889	.....	4,204	1,293	5,497	25,392
Final	1,676	1,293	2,969	1,332	25	.....	1,357	1,612
Yearly proofs examined	.....	.....	.....	.....	.....	.....	6,569	.....
Assignments examined	.....	.....	.....	.....	.....	.....	457	.....
Mineral, final	1,062	860	1,922	875	50	.....	925	997
Coal, final	408	192	600	138	3	.....	141	459
Timber culture:								
Original	141	.....	141	.....	64	.....	64	77
Final	271	.....	271	15	10	.....	25	246
Preemption, final	309	.....	309	28	.....	.....	28	281
Indian allotments	3,198	3,302	6,500	6,208	.....	.....	6,208	292
Indian homesteads	71	8	79	18	.....	61	79	.....
Town sites	9	13	22	14	.....	8	22	.....
Town lots	296	15	311	172	.....	139	311	.....
Public sales (isolated tracts)	253	3,501	3,754	2,234	1	.....	2,235	1,519
Lieu selections (act June 4, 1897)	2,138	83	2,221	611	53	8	672	1,549
Military bounty land warrants	1,259	40	1,299	182	50	2	234	1,065
Miscellaneous entries	4,559	390	4,949	1,106	40	215	1,361	3,588

State and territorial grants, fiscal year ended June 30, 1909.

Kind.	Pending and received.			Disposed of.			Pending June 30, 1909.
	On hand July 1, 1908.	Since received.	Total.	Approved.	Canceled.	Total.	
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
School selections	1,047,911.47	415,551.53	1,463,463.00	385,212.89	57,912.02	443,124.91	1,020,338.09
University selections	33,881.73	7,352.19	41,233.92	3,580.29	4,552.20	8,132.49	33,101.43
Agricultural college selections	41,483.92	.....	41,483.92	12,454.31	80.00	12,534.31	28,949.61
Internal improvement selections	600.07	880.00	1,480.07	720.00	440.00	1,160.00	320.07
Biological station	160.84	.....	160.84	160.84	.....	160.84	.....
Public buildings	23,501.83	103.13	23,604.96	11,833.10	.....	11,833.10	11,771.86
Insane asylums	6,258.09	.....	6,258.09	1,066.40	188.68	1,255.08	5,003.01
Educational, charitable, etc.	18,108.43	.....	18,108.43	243.31	36.87	280.18	17,828.25
Deaf and dumb asylum	8,114.33	.....	8,114.33	1,720.96	1,641.09	3,362.05	4,752.28
Reform schools	3,182.42	.....	3,182.42	1,163.98	160.00	1,323.98	1,858.44
School of mines	9,004.73	.....	9,004.73	4,559.63	1,120.00	5,679.63	3,325.10
Normal schools	18,826.21	40.00	18,866.21	8,471.56	1,998.47	10,470.03	8,396.18
Scientific schools	1,000.00	.....	1,000.00	.....	.....	.....	1,000.00
Blind asylums	3,691.19	81.21	3,772.40	3,292.39	.....	3,292.39	480.01
Reservoirs	52,681.04	.....	52,681.04	36,256.71	2,566.45	38,823.16	13,857.88
Miners' hospitals	2,466.85	.....	2,466.85	358.97	.....	358.97	2,107.88
Two million acres in Nevada	574.24	.....	574.24	.....	574.24	574.24	.....
Forestry—Wisconsin	19,998.39	374.13	20,372.52	19,137.79	860.60	19,998.39	374.13
University preparatory school	997.10	2,828.80	3,825.90	480.00	477.10	957.10	2,868.80
Agricultural and mechanical college	6,486.64	2,238.46	8,725.10	2,718.22	877.13	3,595.35	5,129.75
Colored agricultural and normal university	3,641.02	.....	3,641.02	3,321.02	120.00	3,441.02	200.00
Specific grant total	254,659.07	13,897.92	268,556.99	111,539.48	15,692.83	127,232.31	141,324.68
Grand total	1,302,570.54	429,449.45	1,732,019.99	496,752.37	73,604.85	570,357.22	1,161,662.77

State and territorial grants—Recapitulation.

State or Territory.	Indemnity school land.			Other grants.		
	Pending and selected.	Confirmed.	Canceled.	Pending and selected.	Confirmed.	Canceled.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Arizona	.....	.....	.....	1,120.00	.....	1,120.00
California	436,686.57	.....	9,208.85	640.00	640.00	.....
Colorado	110,124.27	73,946.72	4,002.67	.....	.....	.....
Florida	1,382.81	675.66	120.00	.....	.....	.....
Idaho	73,695.02	11,243.57	516.78	10,658.26	5,141.68	836.69
Louisiana	13,195.09	2,834.75	1,288.14	240.00	.....	240.00
Minnesota	120.00	.....	120.00	.....	.....	.....
Mississippi	960.41	639.67	.....	.....	.....	.....
Montana	140,378.05	32,350.75	600.00	16,409.70	9,485.21	.....
Nevada	.....	.....	.....	1,174.31	80.00	774.24
New Mexico	73,427.94	54,055.91	.....	12,732.67	12,732.20	.47
North Dakota	6,808.19	320.00	1,557.27	1,422.41	160.00	.....
Oklahoma	600.00	440.00	.....	30,717.17	7,201.54	5,339.49
Oregon	50,793.60	13,066.66	455.32	.....	.....	.....
South Dakota	50,055.36	21,445.16	920.00	.....	.....	.....
Utah	226,151.58	119,484.00	4,491.85	148,869.80	56,281.70	6,496.61
Washington	108,179.56	18,500.52	32,926.56	2,382.42	.....	24.55
Wisconsin	.....	.....	.....	20,372.52	19,137.79	860.60
Wyoming	170,904.55	36,209.52	1,704.58	21,817.73	679.36	.18
Total	1,463,463.00	385,212.89	57,912.02	268,556.99	111,539.48	15,692.83

Swamp-land grants.

[Land in place claims (estimated).]

Pending and received:	Acres.
On hand July 1, 1908	898,097.89
Received	74,788.32
Total	972,886.21

	Acres.
Disposed of:	
Patented	69,284.37
Rejected and canceled	267,040.00
Total	336,324.37
Pending June 30, 1909	636,561.84

[Indemnity (cash and land).]

On hand July 1, 1908		1,608,279.51
Cash indemnity approved	[a] 25,200.13	
Land indemnity certified	5,754.76	
Rejected and canceled	52,520.00	
Total		83,474.89
Pending June 30, 1909		1,524,804.62

State desert-land segregations under section 4 of the act of August 18, 1894 (28 Stat., 372–422), and the acts amendatory thereof, commonly known as the Carey Act, during fiscal year ended June 30, 1909.

State.	Applied for.	Segregated.	Rejected or relinquished.	Patented.	Time to reclaim extended.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Colorado	47,062.30	22,008.50	.....	.....	.....
Idaho	402,637.88	308,000.74	9,965.98	80.00	.....
Montana	242,269.63	.....	2,280.00	.....	50,200.92
Nevada	23,642.79	.....	720.00	.....	.....
New Mexico	10,164.68	.....	.....	.....	.....
Oregon	.....	.....	320.00	240.00	.....
Utah	.....	43,119.83	.....	.....	.....
Wyoming	107,678.58	163,909.38	27,645.29	11,200.32	.....
Total	833,455.86	537,038.45	41,211.56	11,520.32	50,200.92

Lands certified or patented on account of railroad and wagon-road grants during the fiscal year ended June 30, 1909.

Railroad.	State.	Acres.
State grants:		
Alabama and Chattanooga	Alabama	80.19
Florida Central and Peninsular	Florida	79.83
Hastings and Dakota	Minnesota	80.00
St. Louis, Iron Mountain and Southern	Arkansas	80.00
St. Paul, Minneapolis and Manitoba, main and branch lines (now Great Northern).	Minnesota	41.40
St. Paul, Minneapolis and Manitoba (act Aug. 5, 1892)	Montana	120.00
Do	Washington	2,961.25
Total of state grants		3,442.67
Corporations:		
Atlantic and Pacific (now Santa Fe Pacific)	Arizona	378,662.64
Do	New Mexico	749,950.47
Atlantic and Pacific (now Santa Fe Pacific), act Apr. 28, 1904	do	40.00
Atlantic and Pacific (now St. Louis and San Francisco)	Missouri	66.75
Central Pacific	California	361.16
Central Pacific (successor to California and Oregon)	do	40.00
Northern Pacific	Idaho	38,394.52
Do	Minnesota	17,863.32
Do	Montana	753,364.23
Do	North Dakota	106,129.57
Do	Oregon	36,151.13
Do	Washington	17,676.37
Do	Wisconsin	59.09
Do	Wyoming	51,874.17
Southern Pacific, main line	California	264,907.91
Union Pacific	Nebraska	3,349.07
Do	Wyoming	3,953.50
Union Pacific (successor to Denver Pacific)	Colorado	40.00
Union Pacific (successor to Kansas Pacific)	do	40.00
Total of corporations		2,422,923.90

[a] $20,291.22.

Lands certified or patented on account of railroad and wagon-road grants during the fiscal year ended June 30, 1909—Continued.

RECAPITULATION.

	Acres
State grants	3,442.67
Corporations	2,422,923.90
Total	2,426,366.57
Railroad selections received	992,155.20

Alleged fraudulent entries acted on during year.

Kind of entry.	Pending June 30, 1908.	Received.	Disposed of.				Pending June 30, 1909.	Hearings ordered by—	
			Approved.	Canceled.	Otherwise disposed of.	Total.		General Land Office.	Forest Service.
Homestead:									
Originals	8,617	7,125	.....	2,526	1,644	4,170	11,572	2,169	419
Finals	529	1,078	838	90	268	1,196	411	104	41
Cash	1,281	902	647	101	283	1,031	1,152	141	18
Desert land:									
Originals	824	803	.....	129	442	571	1,056	116	2
Finals	265	464	11	22	162	195	534	23	2
Timber culture:									
Originals	29	28	.....	4	5	9	48	.....	.....
Finals	111	51	7	18	19	44	118	66	.....
Timber and stone:									
Sworn statements	1,537	757	.....	84	314	398	1,896	79	10
Cash	1,092	679	352	61	237	650	1,121	32	6
Mineral:									
Applications	206	210	.....	7	74	81	335	13	30
Finals	393	330	.....	6	170	176	547	50	28
Selections:									
State	56	305	.....	.....	59	59	302	78	4
Forest	22	311	.....	.....	219	219	114	3	.....
Indian allotments	58	18	.....	.....	33	33	43	.....	.....
Squatter claims	185	91	.....	56	63	119	157	1	36
Mineral locations	160	224	.....	10	8	18	366	68	58
Total	15,365	13,376	1,855	3,114	4,000	8,969	19,772	2,973	654

Field reports on alleged fraudulent entries.

	Total received.	Within coal areas.	Within reclamation projects.	Within unreserved public domain.	Within forest reserves.
Field:					
Forester—					
Adverse	1,441	.....	.....	.....	1,441
Favorable	453	.....	.....	.....	453
Agents—					
Adverse	5,308	1,155	98	4,055	.....
Favorable	7,089	3,537	1,065	2,487	.....
Coal-land cases	4,692	.....	.....	.....	.....

Indictments, convictions, acquittals or dismissals, fines imposed and paid, and prison sentences, June 30, 1908, to June 30, 1909.

Offense.	Indictments.	Convictions.	Prison sentences.	Fines imposed.	Fines paid.	Acquittals or dismissals.
Timber trespass	58	24	1	$1,829.92	$1,829.92	35
Conspiracy	50	39	11	36,761.00	23,044.20	102
Perjury	60	5	1	1.00	1.00	120
Unlawful inclosures	53	34	5	6,471.00	7,022.00	37
Subornation of perjury	5	2	2	2,000.00	1,000.00	17
Embezzlement	2	1	1			
Impersonating government official	2	1	1			
Intimidating homesteaders	11	0				3
Falsifying accounts	0	1	1			0
Securing false affidavits	16	2				
Misuse money, U. S. commissioner	1	0				1
Misuse government frank	1	0				
Using mails to defraud	0	2	2	2.00		
Forgery	3	2	1			5
Impersonating soldier	0	1	1			0
Miscellaneous	7	1	0			2
Total	269	114	27	47,064.92	32,897.12	338

Number and kind of patents issued during fiscal year ended June 30, 1909.

Cash (timber or stone, commuted homestead, etc.)	33,151
Homestead	24,440
Military bounty land warrant	230
Forest lieu selection	700
Timber culture	23
Indian	9,885
Mineral	999
Coal	177
Private land claim	88
Railroad	83
Swamp	16
Special act	41
Surveyor-general's scrip	60
Sioux half-breed scrip	3
Choctaw scrip	5
Porterfield scrip	1
Ware scrip	2
Valentine scrip	3
Agricultural college scrip	4
Wyandotte scrip	1
Crow scrip	1
Industrial school for girls	1
State desert land segregation	5
Total	69,919
Cases approved and awaiting patent June 30, 1909	4,126
	74,045

Area, by classes, of lands patented during fiscal year ended June 30, 1909.

[These statistics not compiled for previous years.]

	Acres.		Acres.
Commuted homestead	2,907,783.09	Desert land segregation	4,101.73
Timber and stone	1,174,791.06	Timber culture	3,501.33
Desert land	195,648.46	Cherokee school land	212.55
Cash, miscellaneous	101,362.697	State industrial school	239.97
Public sales	195,652.32	School land	40.09
Town site	1,810.547	Park site	6.42
Town lot	81.823	Public act 150	3.51
Homestead	3,626,307.279	Private act 105	118.81
Forest lieu selection	215,009.18	Special act—	
Private land claim	236,512.44	June 4, 1884	40.00
Military bounty land warrant	21,621.552	March 3, 1887	80.00
		September 30, 1890	40.00
Indian trust	1,354,145.83	May 28, 1896	80.03
Indian fee	182,763.808	July 1, 1898	598.33
Mineral	50,954.842	March 3, 1903	80.43
Coal	24,853.465	February 24, 1905	240.00
Railroad	2,417,322.29	June 27, 1906	19,137.79
Swamp	65,759.02	June 30, 1906	40.00
Surveyor-general's scrip	3,546.66	February 18, 1907	288.67
Choctaw scrip	1,159.10	March 4, 1907	197.27
Valentine scrip	92.65	April 30, 1908	471.00
Ware scrip	80.00	May 29, 1908	957.38
Sioux half-breed scrip	358.64	March 4, 1909	1.06
Porterfield scrip	40.00		
Wyandotte scrip	40.00	Total	12,808,811.084
Agricultural college scrip	637.96		

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1909.

Location.	Number of applications, entries, etc.	Area entered (acres).	Receipts.			Expenses.		
			Fees and commissions.	Sales of land.	Total.	Salaries and commissions of registers and receivers.	Incidental expenses.	Total.
Alabama:								
Montgomery	1,210	50,850.68	$7,045.31	$22,248.14	$29,293.45	$4,702.18	$2,426.50	$7,128.68
Alaska:								
Juneau	179	10,065.76	1,045.10	75,115.06	76,160.16	4,735.08	1,070.70	5,805.78
Nome	36	706.57	200.00	1,785.00	1,985.00	235.68	.....	235.68
Arizona:								
Phoenix	3,093	468,160.64	30,599.14	77,052.73	107,651.87	6,000.00	3,860.93	9,860.93
Arkansas:								
Camden	910	37,259.99	6,011.57	42,935.98	48,947.55	1,377.41	2,430.36	3,807.77
Dardanelle	310	12,156.00	1,827.87	12,058.44	13,886.31	1,976.37	604.04	2,580.41
Harrison	1,469	78,985.59	10,388.36	13,731.46	24,119.82	5,816.67	2,598.31	8,414.98
Little Rock	944	42,818.06	6,583.66	12,582.75	19,166.41	4,758.95	1,890.67	6,649.62
California:								
Eureka	490	32,904.20	3,787.88	59,787.40	63,575.28	5,119.27	521.15	5,640.42
Independence	455	294,180.76	3,831.83	39,826.91	43,658.74	4,234.30	352.43	4,586.73
Los Angeles	2,255	665,541.90	14,615.18	120,538.11	135,153.29	6,000.00	6,052.68	12,052.68
Oakland	916	90,596.69	7,112.23	32,125.25	39,237.48	6,000.00	3,924.25	9,924.25
Redding	495	31,155.48	5,323.63	40,494.24	45,817.87	6,000.00	1,695.21	7,695.21
Sacramento	541	35,702.13	5,342.04	30,138.37	35,480.41	5,448.94	2,448.75	7,897.69
Susanville	496	64,061.82	4,193.87	31,922.60	36,116.47	4,332.24	1,018.45	5,350.69
Visalia	514	75,321.48	6,584.29	32,948.94	39,533.23	5,980.20	617.85	6,598.05
Colorado:								
Del Norte	667	110,201.56	5,075.93	18,106.91	23,182.84	3,688.02	305.19	3,993.21
Denver	3,597	499,965.52	35,762.67	147,642.85	183,405.52	6,000.00	5,501.86	11,501.86
Durango	611	38,354.86	5,297.60	21,340.96	26,638.56	4,952.76	1,439.08	6,391.84
Glenwood	885	80,910.36	8,837.10	44,619.02	53,456.12	6,000.00	2,213.13	8,213.13
Hugo	2,023	247,450.30	29,201.55	74,373.74	103,575.29	6,000.00	2,575.94	8,575.94
Lamar	1,520	205,758.66	15,731.77	57,077.84	72,809.61	6,000.00	2,767.89	8,767.89
Leadville	206	11,840.66	1,868.69	7,505.21	9,373.90	2,421.18	25.76	2,446.94
Montrose	650	47,954.86	6,158.95	11,698.80	17,857.75	5,931.78	2,865.07	8,796.85
Pueblo	1,752	226,926.23	17,830.68	45,325.02	63,155.70	6,000.00	4,746.36	10,746.36
Sterling	3,039	422,067.79	39,729.91	58,560.07	98,289.98	6,000.00	2,777.31	8,777.31
Florida:								
Gainesville	1,419	77,781.35	9,768.42	36,485.03	46,253.45	6,000.00	4,450.00	10,450.00
Idaho:								
Blackfoot	2,293	305,591.49	26,928.41	54,862.29	81,790.70	6,000.00	2,886.35	8,886.35
Boise	2,697	591,340.46	25,883.38	55,725.11	81,608.49	6,000.00	3,628.81	9,628.81

Coeur d'Alene	971	63,140.77	10,284.89	58,405.80	68,690.69	6,000.00	2,666.20	8,666.20
Hailey	1,537	367,122.97	14,327.50	30,876.56	45,204.06	6,000.00	2,785.40	8,785.40
Lewiston	973	56,248.19	7,983.87	47,665.50	55,649.37	6,000.00	3,003.18	9,003.18
Iowa:								
Des Moines	2	4.04	244.12	109.98	354.10	1,246.32	1.63	1,247.95
Kansas:								
Colby	471	27,391.71	4,500.85	16,599.34	21,100.19	3,802.90	1,011.23	4,814.13
Dodge City	2,022	125,667.26	15,574.50	137,581.94	153,156.44	6,000.00	4,592.14	10,592.14
Topeka	130	8,419.64	1,273.06	3,962.90	5,235.96	1,820.34	254.08	2,074.42
Louisiana:								
Natchitoches	337	9,199.07	2,209.27	10,003.50	12,212.77	2,826.32	899.02	3,725.34
New Orleans	822	25,034.02	5,080.86	26,059.92	31,140.78	4,966.97	2,334.33	7,301.30
Michigan:								
Marquette	715	33,777.18	5,985.71	32,631.51	38,617.22	6,000.00	2,260.30	8,260.30
Minnesota:								
Cass Lake	1,537	110,474.95	14,053.47	17,525.35	31,578.82	6,000.00	2,684.37	8,684.37
Crookston	1,112	71,014.68	11,232.45	3,877.07	15,109.52	6,000.00	2,920.94	8,920.94
Duluth	3,686	190,793.87	23,611.23	324,665.27	348,276.50	6,000.00	4,033.00	10,033.00
Mississippi:								
Jackson	845	35,274.44	4,957.56	12,653.78	17,611.34	3,690.58	2,602.48	6,293.06
Missouri:								
Springfield	1,050	53,330.91	5,359.25	32,194.76	37,554.01	4,753.15	1,143.44	5,896.59
Montana:								
Billings	1,020	123,681.66	15,640.32	9,778.01	25,418.33	6,000.00	2,836.16	8,836.16
Bozeman	997	155,782.05	14,385.44	43,215.39	57,600.83	6,000.00	1,738.53	7,738.53
Glasgow	1,463	232,162.68	17,507.54	34,681.19	52,188.73	6,000.00	3,161.36	9,161.36
Great Falls	3,702	588,304.21	27,440.47	86,509.60	113,950.07	6,000.00	3,120.50	9,120.50
Helena	1,256	161,139.36	13,174.81	72,728.56	85,903.37	6,000.00	2,673.32	8,673.32
Kalispell	380	19,383.29	3,371.31	22,342.95	25,714.26	3,898.10	1,232.77	5,130.87
Lewistown	2,774	335,608.26	27,963.61	123,806.08	151,769.69	6,000.00	2,665.56	8,665.56
Miles City	2,345	701,304.65	40,514.06	64,070.34	104,584.40	6,000.00	2,721.72	8,721.72
Missoula	648	143,539.39	6,315.97	53,142.55	59,458.52	6,000.00	3,084.81	9,084.81
Nebraska:								
Alliance	1,949	684,475.57	21,851.79	32,283.16	54,134.95	6,000.00	3,606.34	9,606.34
Broken Bow	1,085	472,440.55	12,605.04	15,428.33	28,033.37	5,698.00	1,689.96	7,387.96
Lincoln	320	50,321.32	2,778.96	9,980.79	12,759.75	2,494.48	35.89	2,530.37
North Platte	910	274,698.95	11,395.52	15,683.37	27,078.89	5,983.40	1,575.63	7,559.03
O'Neill	480	113,312.47	5,281.40	7,703.24	12,984.64	3,775.18	1,320.77	5,095.95
Valentine	1,033	384,623.24	11,463.63	26,693.86	38,157.49	5,942.42	1,560.00	7,502.42
Nevada:								
Carson City	901	78,190.07	6,810.24	74,440.99	81,251.23	6,000.00	2,685.90	8,685.90
New Mexico:								
Clayton	2,060	260,060.91	21,034.77	94,276.90	115,311.67	6,000.00	5,625.34	11,625.34
Las Cruces	1,178	199,203.22	11,023.33	33,402.40	44,425.73	6,000.00	1,616.35	7,616.35
Roswell	5,733	915,776.89	72,542.50	203,676.08	276,218.58	6,000.00	7,571.25	13,571.25
Santa Fe	3,659	904,891.46	51,247.97	69,153.27	120,401.24	6,000.00	5,033.40	11,033.40
Tucumcari	2,717	262,866.70	28,033.75	145,268.76	173,302.51	6,000.00	5,675.28	11,675.28
North Dakota:								
Bismarck	3,698	195,126.75	33,414.44	234,208.09	267,622.53	6,000.00	5,485.95	11,485.95
Devils Lake	1,433	39,661.83	7,665.47	58,098.42	65,763.89	6,000.00	4,655.26	10,655.26
Dickinson	2,612	289,461.60	29,221.80	155,965.57	185,187.37	6,000.00	5,322.07	11,322.07

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1909—Continued.

Location.	Number of applications, entries, etc.	Area entered (acres).	Receipts.			Expenses.		
			Fees and commissions.	Sales of land.	Total.	Salaries and commissions of registers and receivers.	Incidental expenses.	Total.
North Dakota—Continued.								
Fargo	811	29,241.94	$6,672.84	$44,919.14	$51,591.98	$6,000.00	$1,074.10	$7,074.10
Minot	2,946	79,377.80	13,903.34	251,638.87	265,542.21	6,000.00	7,416.86	13,416.86
Williston	4,671	244,583.52	28,162.83	418,815.23	446,978.06	5,741.67	5,853.83	11,595.50
Oklahoma:								
El Reno	1,275	9,252.15	6,196.78	48,856.35	55,053.13	6,000.00	1,791.07	7,791.07
Guthrie	1,250	53,083.91	8,528.76	25,014.43	33,543.19	6,000.00	4,679.79	10,679.79
Lawton	2,905	51,811.25	18,348.13	224,175.19	242,523.32	6,000.00	4,926.09	10,926.09
Woodward	4,606	183,187.34	28,927.50	197,104.47	226,031.97	5,725.00	6,456.23	12,181.23
Oregon:								
Burns	1,292	318,087.27	11,096.84	44,789.80	55,886.64	6,000.00	1,592.28	7,592.28
La Grande	2,186	175,340.35	17,734.25	172,978.44	190,712.69	5,741.67	4,111.55	9,853.22
Lakeview	1,125	163,316.16	10,520.01	87,280.29	97,800.30	5,240.48	1,848.30	7,088.78
Portland	1,062	84,392.04	10,555.48	60,447.42	71,002.90	6,000.00	2,356.14	8,356.14
Roseburg	3,538	217,835.96	25,066.55	394,189.91	419,256.46	6,000.00	6,985.38	12,985.38
The Dalles	1,759	128,025.35	12,780.62	111,493.70	124,274.32	6,000.00	3,612.39	9,612.39
South Dakota:								
Aberdeen	513	14,854.11	3,045.13	32,251.10	35,296.23	3,691.84	1,158.08	4,849.92
Chamberlain	2,381	123,423.42	13,851.28	130,616.36	144,467.24	6,000.00	4,762.31	10,762.31
Gregory	1,935	261,691.35	25,493.29	723.01	26,216.30	1,783.34	1,487.15	3,270.49
Lemmon	6,434	601,463.56	54,561.16	273,521.90	328,083.06	6,000.00	4,970.58	10,970.58
Mitchell	99	9,134.47	2,268.05	2,431.11	4,699.16	2,425.40	1,725.63	4,151.03
Pierre	3,884	229,289.74	26,926.86	185,389.03	212,315.89	6,000.00	5,492.82	11,492.82
Rapid City	7,870	928,194.06	71,728.88	223,317.39	295,046.27	6,000.00	8,567.30	14,567.30
Utah:								
Salt Lake City	1,804	541,506.92	16,323.57	223,152.73	239,476.30	6,000.00	3,368.74	9,368.74
Vernal	486	78,136.81	6,960.12	1,881.77	8,841.89	4,540.92	1,620.00	6,160.92
Washington:								
North Yakima	795	71,362.28	8,055.67	43,589.46	51,645.13	6,000.00	3,025.90	9,025.90
Olympia	143	7,288.86	1,341.88	6,557.88	7,899.76	2,153.04	578.05	2,731.09
Seattle	681	45,793.79	4,658.62	73,543.97	78,202.59	6,000.00	3,133.96	9,133.96
Spokane	2,004	140,108.81	21,636.72	89,784.13	111,420.85	6,000.00	5,444.70	11,444.70
Vancouver	833	81,997.15	7,953.90	94,621.57	102,575.47	6,000.00	2,897.70	8,897.70
Walla Walla	1,051	87,795.46	11,491.88	45,695.80	57,187.68	6,000.00	3,538.50	9,538.50
Waterville	2,043	158,341.16	20,027.17	68,293.86	88,321.03	6,000.00	3,498.89	9,498.89
Wisconsin:								
Wausau	788	19,061.18	5,217.56	9,872.38	15,089.94	4,929.34	1,469.74	6,399.08

Wyoming:								
Buffalo	1,187	111,978.97	9,043.49	105,392.66	114,436.15	6,000.00	2,113.95	8,113.95
Cheyenne	1,618	251,792.15	21,683.13	96,752.86	118,435.99	6,000.00	2,410.34	8,410.34
Douglas	1,434	189,252.84	14,285.87	38,445.45	52,731.32	6,000.00	1,481.36	7,481.36
Evanston	537	92,883.17	5,316.45	20,288.01	25,604.46	4,607.82	205.68	4,813.50
Lander	1,091	81,794.31	8,592.79	56,296.51	64,889.30	6,000.00	1,784.28	7,784.28
Sundance	1,582	169,778.52	16,003.52	74,249.54	90,253.06	6,000.00	1,885.57	7,885.57
Total	166,857	19,654,580.76	1,536,890.67	7,698,337.03	9,235,227.70	547,189.71	296,906.13	844,095.84

RECAPITULATION BY STATES.

Alabama	1,210	50,850.68	$7,045.31	$22,248.14	$29,293.45	$4,702.18	$2,426.50	$7,128.68
Alaska	215	10,772.33	1,245.10	76,900.06	78,145.16	4,970.76	1,070.70	6,041.46
Arizona	3,093	468,160.64	30,599.14	77,052.73	107,651.87	6,000.00	3,860.93	9,860.93
Arkansas	3,633	171,219.64	24,811.46	81,308.63	106,120.09	13,929.40	7,523.38	21,452.78
California	6,162	1,289,464.46	50,790.95	387,781.82	438,572.77	43,114.95	16,630.77	59,745.72
Colorado	14,953	1,892,030.80	165,494.85	486,250.42	651,745.27	52,993.74	25,217.59	78,211.33
Florida	1,419	77,781.35	9,768.42	36,485.03	46,253.45	6,000.00	4,450.00	10,450.00
Idaho	8,471	1,383,443.88	85,408.05	247,535.26	332,943.31	30,000.00	14,969.94	44,969.94
Iowa	2	4.04	244.12	109.98	354.10	1,246.32	1.63	1,247.95
Kansas	2,623	161,478.61	21,348.41	158,144.18	179,492.59	11,623.24	5,857.45	17,480.69
Louisiana	1,159	34,233.09	7,290.13	36,063.42	43,353.55	7,793.29	3,233.35	11,026.64
Michigan	715	33,777.18	5,985.71	32,631.51	38,617.22	6,000.00	2,260.30	8,260.30
Minnesota	6,335	372,283.50	48,897.15	346,067.69	394,964.84	18,000.00	9,638.31	27,638.31
Mississippi	845	35,274.44	4,957.56	12,653.78	17,611.34	3,690.58	2,602.48	6,293.06
Missouri	1,050	53,330.91	5,359.25	32,194.76	37,554.01	4,753.15	1,143.44	5,896.59
Montana	14,585	2,460,905.55	166,313.53	510,274.67	676,588.20	51,898.10	23,234.73	75,132.83
Nebraska	5,777	1,979,872.10	65,376.34	107,772.75	173,149.09	29,893.48	9,788.59	39,682.07
Nevada	901	78,190.07	6,810.24	74,440.99	81,251.23	6,000.00	2,685.90	8,685.90
New Mexico	15,347	2,542,799.18	183,882.32	545,777.41	729,659.73	30,000.00	25,521.62	55,521.62
North Dakota	16,171	877,453.44	119,040.72	1,163,645.32	1,282,686.04	35,741.67	29,808.07	65,549.74
Oklahoma	10,036	297,334.65	62,001.17	495,150.44	557,151.61	23,725.00	17,853.18	41,578.18
Oregon	10,962	1,086,997.13	87,753.75	871,179.56	958,933.31	34,982.15	20,506.04	55,488.19
South Dakota	23,116	2,168,050.71	197,874.65	848,249.90	1,046,124.55	31,900.58	28,163.87	60,064.45
Utah	2,290	619,643.73	23,283.69	225,034.50	248,318.19	10,540.92	4,988.74	15,529.66
Washington	7,550	592,687.51	75,165.84	422,086.67	497,252.51	38,153.04	22,117.70	60,270.74
Wisconsin	788	19,061.18	5,217.56	9,872.38	15,089.94	4,929.34	1,469.74	6,399.08
Wyoming	7,449	897,479.96	74,925.25	391,425.03	466,350.28	34,607.82	9,881.18	44,489.00
Total	166,857	19,654,580.76	1,536,890.67	7,698,337.03	9,235,227.70	547,189.71	296,906.13	844,095.84
Swamp lands patented		69,284.37						
Sales of Indian lands		168,638.63			2,334,885.47			
Depredations, government property, copies of records, reclamation water-right charges, etc					330,136.61			
Total	166,857	19,892,503.76	1,536,890.67	7,698,337.03	11,900,249.78	547,189.71	296,906.13	844,095.84

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1909—Continued.

RECAPITULATION BY CLASSES OF ENTRIES.

State or Territory.	Sales of land—															Sales of abandoned military reservations.
	At public auction.			Subject to preemption entry.			Timber and stone.			Mineral.			Coal.			
	Entries.	Acres.	Amount.	Entries.	Acres.	Amount.	Entries.	Acres.	Amount.	Entries.	Acres.	Amount.	Entries.	Acres.	Amount.	
Alabama	2	232.46	$290.60				25	2,287.33	$6,264.63							
Alaska	2	193.94	244.48							34	3,793.44	$13,485.00	44	6,317.05	$63,170.58	
Arizona										120	6,537.93	31,352.50				
Arkansas	9	368.86	481.09				148	16,702.08	42,993.36	7	580.00	1,450.00				
California	79	5,136.49	8,881.00				438	59,205.63	147,567.86	162	19,990.07	64,417.50				
Colorado	204	19,043.34	31,994.00				131	15,085.33	33,819.70	299	8,059.98	36,770.00	26	4,326.41	48,464.10	
Florida	5	313.32	404.06				64	7,736.95	19,312.44							$1,133.51
Idaho	46	2,385.83	3,353.28	1	160.00	$200.00	343	41,162.31	105,680.03	97	5,136.56	21,925.00				20,521.03
Iowa	1	4.04	44.44													
Kansas	79	5,580.78	8,538.60													
Louisiana							123	8,755.65	21,822.79							
Michigan							157	11,929.05	29,817.65							
Minnesota	16	446.33	743.33				1,037	124,479.93	311,063.61							
Mississippi	24	1,224.12	2,177.05				11	619.56	1,548.78							
Missouri																
Montana	326	26,203.74	44,883.94	71	7,839.12	9,798.89	323	39,175.54	97,893.50	167	8,147.46	32,910.22	15	1,938.26	43,965.20	187.50
Nebraska	468	65,998.68	93,315.13													2,711.60
Nevada										285	14,167.74	69,040.00				
New Mexico	20	1,521.74	2,283.05							35	3,323.30	12,797.50	8	920.00	16,400.00	139.20
North Dakota	638	36,238.68	91,430.64				3	400.00	1,000.00				14	736.70	10,734.00	
Oklahoma							1	40.00	100.00	1	160.00	400.00				
Oregon	326	28,600.75	39,447.95				2,193	281,898.63	696,708.00	27	2,515.02	11,095.00	1	40.00	800.00	
South Dakota	863	57,310.15	135,821.08				102	10,518.29	26,101.44	19	1,049.85	4,435.00	7	513.74	4,737.40	97.60
Utah	3	280.00	350.00				5	360.00	900.00	151	6,700.05	33,455.00	46	6,920.52	178,818.05	204.78
Washington	205	13,882.49	28,622.38	2	316.75	395.94	590	66,464.03	165,352.36	23	1,402.78	5,967.50	18	4,313.15	86,263.00	
Wisconsin	1	80.00	200.00				27	1,763.11	4,407.78							
Wyoming	184	15,586.71	22,198.08				286	34,309.76	86,494.05	41	2,929.31	11,829.60	34	5,019.29	103,149.70	1,216.73
Total	3,501	280,632.45	515,704.18	74	8,315.87	10,394.83	6,007	722,893.18	1,798,847.98	1,468	84,493.49	351,329.82	213	31,045.12	556,502.03	26,211.95

State or Territory.	Excess payments on homestead and other entries.			Desert-land entries.					
	Entries.	Acres.	Amount.	Entries.		Area.		Amount.	
				Original.	Final.	Original.	Final.	Original.	Final.
						Acres.	*Acres.*		
Alabama	79	149.02	$186.65						
Alaska									
Arizona	63	131.76	187.40	710	14	141,887.00	1,839.03	$35,472.22	$1,844.58
Arkansas	58	313.30	391.65						
California	151	621.09	975.81	1,509	427	340,410.71	68,336.41	85,088.59	68,334.49
Colorado	639	2,222.00	3,398.79	2,114	125	423,477.95	21,615.24	105,887.00	21,615.24
Florida	161	266.39	335.53						
Idaho	248	875.37	1,158.10	1,056	142	166,955.37	19,922.08	41,659.46	18,920.47
Iowa									
Kansas	44	158.05	265.33						
Louisiana	38	115.87	170.78						
Michigan	17	60.57	75.81						
Minnesota	64	362.89	456.69						
Mississippi	39	72.74	80.30						
Missouri	9	35.56	43.46						
Montana	489	2,127.00	4,094.54	1,438	466	253,906.86	81,572.30	63,479.17	81,579.05
Nebraska	354	1,496.90	1,915.27						
Nevada	9	80.00	124.65	60	6	12,591.26	861.33	3,147.93	861.33
New Mexico	540	1,551.93	1,955.92	630	81	103,852.31	14,179.55	25,963.18	14,187.05
North Dakota	310	1,442.30	2,644.74	7	10	1,120.00	1,740.17	280.00	1,757.21
Oklahoma	37	69.28	86.70						
Oregon	199	1,002.21	1,526.94	579	61	85,219.52	8,320.73	21,304.91	8,320.73
South Dakota	518	1,847.29	2,208.84	872	46	134,248.59	8,234.77	33,528.90	8,234.80
Utah	44	112.40	167.07	219	20	34,389.53	2,241.75	8,597.39	2,242.21
Washington	172	865.51	1,337.97	425	23	68,156.08	2,919.95	17,038.91	2,919.95
Wisconsin	10	58.84	112.90						
Wyoming	274	1,222.17	1,731.12	704	308	111,266.46	48,394.86	27,776.87	48,265.77
Total	4,566	17,260.44	25,632.96	10,323	1,729	1,877,481.64	280,178.17	469,224.53	279,082.88

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1909—Continued.

RECAPITULATION BY CLASSES OF ENTRIES—Continued.

State or Territory.	Homestead entries.								
	Entries.			Area.			Amount.		
	Original.	Final.	Commuted.	Original.	Final.	Commuted.	Original.	Final.	Commuted.
Alabama	570	367	125	47,810.53	34,488.54	12,026.67	$4,984.15	$862.68	$14,976.35
Alaska	8			467.90			80.10		
Arizona	1,836	154	44	259,106.69	21,074.90	6,222.62	26,929.34	815.65	7,946.03
Arkansas	1,615	1,355	254	153,568.70	156,357.42	28,855.83	15,305.86	3,908.16	35,992.53
California	1,526	396	60	216,699.40	55,325.62	7,900.35	24,152.58	2,475.33	11,747.56
Colorado	8,347	1,009	902	1,346,261.21	152,492.75	141,230.87	142,110.09	6,483.04	203,601.59
Florida	605	385	95	67,670.50	49,934.66	12,171.45	6,443.63	1,249.36	15,194.49
Idaho	4,483	873	193	587,198.56	123,062.95	25,317.91	61,931.55	5,385.06	33,967.89
Iowa			1			52.43			65.54
Kansas	1,053	688	719	155,857.83	105,843.73	109,618.02	14,807.57	3,356.37	149,290.25
Louisiana	351	372	144	25,477.44	31,178.32	10,541.81	2,940.60	945.41	14,069.85
Michigan	210	125	26	21,568.13	13,409.38	1,926.44	2,113.11	336.06	2,408.05
Minnesota	1,996	1,679	221	233,587.95	222,536.57	25,858.23	22,446.52	5,975.12	33,748.36
Mississippi	405	265	68	29,014.75	24,329.10	6,624.10	3,277.37	611.71	8,253.53
Missouri	359	407		27,855.06	38,405.68		2,997.52	1,030.09	
Montana	7,484	1,037	573	1,159,486.15	156,444.63	86,943.85	132,444.59	8,070.89	131,357.66
Nebraska	4,109	759	56	1,913,713.42	156,972.15	6,766.87	56,940.35	3,128.34	9,830.75
Nevada	207	23	3	27,200.22	3,550.29	333.30	3,082.86	171.45	533.25
New Mexico	9,634	1,195	2,422	1,585,367.19	188,014.94	377,306.53	158,286.74	7,103.59	471,751.51
North Dakota	5,655	4,210	4,989	786,416.70	647,148.11	630,489.19	79,996.22	24,053.86	1,055,098.77
Oklahoma	2,094	5,166	2,712	266,888.59	786,189.90	396,287.64	24,319.95	19,588.83	491,214.58
Oregon	2,983	1,185	455	400,169.69	177,241.89	69,184.02	43,968.13	7,509.75	91,448.51
South Dakota	12,516	1,013	6,400	1,913,295.51	151,722.41	993,405.76	169,794.04	3,963.54	632,760.01
Utah	832	37	2	135,722.31	5,634.62	240.00	14,229.38	223.18	300.00
Washington	2,714	1,727	412	357,978.59	253,568.38	59,738.72	42,054.29	13,806.62	112,384.79
Wisconsin	219	447	45	16,882.39	47,973.33	3,101.27	2,080.80	1,904.15	5,151.70
Wyoming	3,634	636	336	566,880.79	96,566.52	52,071.54	59,431.72	3,873.32	88,563.11
Total	75,445	25,510	21,257	12,302,146.20	3,699,466.79	3,064,215.42	1,117,149.06	126,831.56	3,622,256.66

State or Territory.	Applications.				Mineral protests.		Filings.										Fees.		Coal land.			
	For timber and stone lands.		Mineral.				Preemption.		Homestead.		Coal land.		Reservoir.		Town site.		Cancellation.	Received for reducing testimony to writing, etc.	Applications.		Adverse claims.	
	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	Amount.	Amount.	No.	Fees.	No.	Fees.
Alabama	36	$360.00																$834.48				
Alaska			44	$440	2	$20					15	$45							65	$650	1	$10
Arizona			105	1,050	18	180			15	$45			6	$18	3	$9		792.15				
Arkansas	167	1,670.00	13	130					7	14								3,783.44				
California	550	5,490.00	150	1,500	17	170			4	12	5	15			2	6		8,486.66				
Colorado	219	2,190.00	295	2,950	33	330	91	$273	174	522	96	288	25	75			$201	8,931.57				
Florida	74	740.00	5	50													1	1,233.43				
Idaho	406	4,060.00	96	960	8	80			3	9	17	51			2	6	14	4,987.74				
Iowa																		244.12				
Kansas							31	62	6	12							57	3,045.47				
Louisiana	131	1,310.00																2,094.12				
Michigan	176	1,760.00							1	2								1,774.54				
Minnesota	1,243	12,430.00																5,698.59				
Mississippi	11	110.00																900.48				
Missouri																		1,331.64				
Montana	396	3,960.00	141	1,410	9	90	74	222	39	117	106	318	20	60			16	6,385.60				
Nebraska									26	52			4	8			16	5,227.41				
Nevada	1	10.00	273	2,730	26	260			1	3	2	6	2	6				244.93				
New Mexico			41	410	6	60			62	186	13	39	15	45				6,375.99				
North Dakota	6	60.00							20	40	81	162	70	140			1	13,464.13				
Oklahoma	1	10.00	1	10					6	12							3	10,497.59				
Oregon	2,433	24,330.00	19	190					8	23	9	27						7,380.57				
South Dakota	154	1,537.50	24	240	1	10			315	630	64	128	96	192				18,627.25				
Utah	6	60.00	145	1,450	20	200			1	3	28	84			1	3		1,046.70				
Washington	850	8,500.00	36	360	3	30	2	6	1	3	118	354					5	8,877.93				
Wisconsin	34	340.00															2	878.61				
Wyoming	356	3,560.00	28	280	1	10			25	75	312	936	31	93			9	4,373.21				
Total	7,250	72,487.50	1,416	14,160	144	1,440	198	563	714	1,760	866	2,453	269	637	8	24	325	127,518.35	65	650	1	10

Sales of Indian lands during fiscal year ended June 30, 1909.

	Entries or partial payments.	Area.	Receipts—sales and interest.
		Acres.	
Alabama:			
Montgomery—Cherokee Indian school lands	1	80.18	$100.23
California:			
Eureka—			
Klamath River Indian Reservation	1	120.00	300.00
Round Valley Indian Reservation	1	.....	34.50
Oakland—Round Valley Indian Reservation	34	.....	2,480.24
Colorado:			
Durango—			
Southern Ute, under act Feb. 20, 1895	81	7,847.71	7,686.80
Ceded Ute, under acts June 15, 1880, and July 28, 1882	22	2,933.01	1,131.13
Glenwood Springs—Ute, under acts June 15, 1880, and July 28, 1882	265	34,734.34	22,758.27
Montrose—Ute, under acts June 15, 1880, and July 28, 1882	409	45,532.72	39,052.03
Idaho:			
Blackfoot—Shoshone and Bannock Indian lands (town lots)	11	.....	110.00
Kansas:			
Dodge City—Osage trust and diminished reserve lands	87	4,768.57	8,677.23
Topeka—			
Osage trust and diminished reserve lands	3	120.86	389.56
Kansas trust and diminished reserve lands	1	.....	19.53
Osage ceded	1	7.10	8.88
Minnesota:			
Cass Lake—Chippewa Indian lands	145	.....	24,740.95
Duluth—Chippewa Indian lands	93	.....	7,703.69
Crookston—			
Red Lake Indian Reservation lands	397	.....	93,832.20
Chippewa Indian lands	390	.....	50,337.78
Montana:			
Billings—Crow Indian ceded lands	458	.....	80,439.09
Nebraska:			
O'Neill—Omaha Indian lands	1	.....	1,205.20
Oklahoma:			
El Reno—			
Cheyenne and Arapahoe	7	237.65	1,188.55
Wichita ceded lands	745	.....	140,511.75
Lawton—			
Kiowa, Comanche, and Apache Indian lands	2,371	.....	1,242,671.00
Kiowa and Apache Indians, under act Mar. 27, 1908	1,503	.....	87,093.16
Oregon:			
La Grande—Umatilla Indian Reservation lands	40	4,533.43	6,513.33
North Dakota:			
Devils Lake—Sioux Indian lands	261	196.27	34,878.27
South Dakota:			
Gregory—Sioux Indian lands, Rosebud Reservation	3,159	51,509.61	588,733.48
Mitchell—Sioux Indian lands, Rosebud Reservation	468	.....	68,142.01
Pierre—Lower Brulé Indian Reservation	437	.....	45,677.58
Utah:			
Vernal—Uintah Valley Indian Reservation	128	158.34	17,689.38
Washington:			
Spokane—Colville Indian Reservation	131	11,369.99	33,538.82
Waterville—Colville Indian Reservation	107	4,488.85	8,100.04
Wyoming:			
Lander—Shoshone or Wind River Indian Reservation lands	577	.....	35,306.40
Total	12,355	168,638.63	2,651,051.08

REPORT OF THE COMMISSIONER OF PENSIONS.

COMMISSIONERS OF PENSIONS SINCE 1833.

Name.	By whom appointed.	Whence appointed.	Date of commission.
Edwards, James L	Jackson	Virginia	Mar. 3, 1833
Heath, James E	Fillmore	do	Nov. 27, 1850
Waldo, Loren P	Pierce	Connecticut	Mar. 17, 1853
Minot, Josiah	do	New Hampshire	Aug. 1, 1855
Whiting, George C	do	Virginia	Jan. 19, 1857
Barrett, Joseph H	Lincoln	Ohio	Apr. 15, 1861
Cox, Christopher C	Johnson	Maryland	July 28, 1868
Van Aernam, Henry	Grant	New York	May 1, 1869
Baker, James H	do	Minnesota	Apr. 20, 1871
Atkinson, Henry M	do	Nebraska	Mar. 26, 1875
Gill, Charles R	do	Wisconsin	Feb. 10, 1876
Bentley, John A	do	do	Mar. 28, 1876
Dudley, William W	Garfield	Indiana	June 27, 1881
Clarke, Otis P. G	Arthur	Rhode Island	Nov. 15, 1884
Black, John C	Cleveland	Illinois	Mar. 19, 1885
Tanner, James	Harrison	New York	Mar. 27, 1889
Raum, Green B	do	Illinois	Oct. 19, 1889
Lochren, William	Cleveland	Minnesota	Apr. 13, 1893
Murphy, Dominic I	do	Pennsylvania	May 28, 1896
Evans, Henry Clay	McKinley	Tennessee	Apr. 1, 1897
Ware, Eugene F	Roosevelt	Kansas	May 10, 1902
Warner, Vespasian	do	Illinois	Mar. 4, 1905

REPORT OF THE COMMISSIONER OF PENSIONS.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PENSIONS,
Washington, D. C., September 14, 1909.

SIR: I have the honor to submit my annual report, consisting of a general statement and exhibits, 1 to 10, inclusive, showing the operations of the Bureau of Pensions for the fiscal year ended June 30, 1909.

GENERAL STATEMENT.

Exhibit 1 shows the number of pensioners on the roll at the beginning of the year, the number added, and the number of the various classes dropped from the roll during the year. The number of pensioners at the beginning of the year was 951,687. The number of new pensioners added to the roll during the year was 45,010 originals, 121 restorations, and 957 renewals, making a total of 46,088. The number of pensioners whose names were dropped from the roll during the year was 51,581. The number of pensioners at the close of the year was 946,194, a net decrease of 5,493. The losses to the roll during the year were as follows:

By death	48,312
By remarriage	1,049
By minors arriving at the age of 16 years	963
By failure to claim for three years	551
For other causes	706
Total	51,581

The number of survivors of the civil war on the roll at the close of the year was 593,961, a decrease of 27,024 during the year. The number of survivors of the civil war whose names were dropped from the roll on account of death during the year was 32,831.

The following table shows the number of pensioners, by classes, on the roll at the close of the fiscal years 1909 and 1908, together with the gains and losses of each class:

Pensioners on the roll June 30, 1909, and June 30, 1908.

	1909.	1908.	Gain.	Loss.
Revolutionary war:				
Daughters	1	2		1
War of 1812:				
Widows	395	471		76
Indian wars:				
Survivors	1,744	1,820		76
Widows	2,881	3,018		137

Pensioners on the roll June 30, 1909, and June 30, 1908—Continued.

	1909.	1908.	Gain.	Loss.
War with Mexico:				
Survivors	2,459	2,932	.....	473
Widows	6,633	6,914	.....	281
Civil war:				
Act of February 6, 1907	358,315	338,341	19,974	.....
General law—				
Invalids	131,065	142,044	.....	10,979
Widows	73,356	75,515	.....	2,159
Minor children	498	541	.....	43
Mothers	2,996	3,688	.....	692
Fathers	493	656	.....	163
Brothers, sisters, sons, and daughters	280	240	40	.....
Helpless children	514	528	.....	14
Act of June 27, 1890—				
Invalids	104,581	140,600	.....	36,019
Minor children	4,010	3,954	56	.....
Helpless children	323	295	28	.....
Act of April 19, 1908—				
Widows	211,781	188,445	23,336	.....
Army nurses	478	510	.....	32
War with Spain:				
Invalids	21,967	20,548	1,419	.....
Widows	1,159	1,145	14	.....
Minor children	333	331	2	.....
Mothers	3,097	3,096	1	.....
Fathers	529	536	.....	7
Brothers and sisters	8	7	1	.....
Helpless children	2	2	.....	.....
Regular establishment:				
Invalids	12,426	11,786	640	.....
Widows	2,648	2,580	68	.....
Minor children	129	120	9	.....
Mothers	923	871	52	.....
Fathers	154	139	15	.....
Brothers and sisters	7	5	2	.....
Helpless children	9	7	2	.....
Total	946,194	951,687	45,659	51,152
Net loss	.....	.....	.....	5,493

The annual value of the pension roll at the close of the year was $160,682,870, an increase of $1,187,169 over the previous year. The annual value is the amount which would be required to pay the pensioners on the roll for one entire year should there be no changes in the rates or in the number of pensioners during the year.

The average annual value of the pension of each pensioner for each year for the last five years is shown by the table below:

Average value of each pension for the last five years.

	1909.	1908.	1907.	1906.	1905.
Average annual value of each pension	$169.82	$167.59	$145.60	$138.18	$136.96
Regular establishment	181.77	173.76	173.12	173.35	174.19
General law, civil war	219.96	215.30	204.20	191.43	187.51
Act of June 27, 1890	135.55	130.75	112.32	114.33	113.20
War with Spain	126.83	126.87	127.19	127.33	127.90
Act of February 6, 1907	169.40	167.70	170.09	.....	.....
Act of April 19, 1908	145.42	145.10	.....	.....	.....

Exhibit 2 shows the amount of first payments made by pension agents on each class of new certificates issued by the bureau during the fiscal year 1909. The amount paid in first payments for the

year was $6,489,416.73, or $6,905,216.68 less than the first payments of the previous year. The number of certificates upon which these first payments were made was 124,634 for 1909, while for the year 1908 the number was 316,500. The average amount paid as the first payment on each new certificate was $52.07.

The following table shows the first payments made each year during the last five years:

First payments made during the last five fiscal years.

Fiscal year.	Number.	Amount.	Average.
1909	124,634	$6,489,416	$52.07
1908	316,500	13,394,633	42.32
1907	186,973	6,643,768	35.53
1906	111,803	6,152,182	55.02
1905	162,907	8,940,064	54.87

At the close of the fiscal year there were 8,273 outstanding certificates upon which no first payments had been made. The amount due on such certificates was $401,559.82. These certificates did not reach the agencies in time to secure vouchers and make the payments thereon before the close of the year.

Exhibit 3 shows the appropriations and disbursements for the fiscal year 1909, together with the unexpended balances at the close of the year. The amounts appropriated, repayments to the appropriation, and the amounts disbursed were as follows:

Receipts and disbursements for fiscal year ended June 30, 1909.

Appropriation for pensions	$162,000,000.00
Repayments to the appropriation	2,990.17
Total amount available for pensions	162,002,990.17
Amount disbursed	161,973,703.77
Balance covered into the Treasury	29,286.40
Appropriation for medical examinations	500,000.00
Amount expended and unpaid	310,646.64
Balance covered into the Treasury	189,353.36
Appropriations for salaries and clerk hire, pension agencies	482,000.00
Repayments to the appropriation	17.17
Amount available	482,017.17
Amount disbursed	476,213.00
Balance covered into the Treasury	5,804.17
Appropriations for rent, contingent expenses, and inspection of pension agencies	71,000.00
Repayments to the appropriation	24.01
Total available	71,024.01

Amount disbursed	$47,781.56
Balance	23,242.45
Amount yet to be paid for supplies furnished	16,845.61
Balance to be covered into the Treasury	6,396.84
Appropriation for salaries, Pension Bureau	1,650,270.00
Amount disbursed	1,590,388.45
Balance covered into the Treasury	59,881.55
Appropriation for salaries, per diem, and expenses of special examiners	380,000.00
Amount disbursed	345,893.55
Balance covered into the Treasury	34,106.45

Summary of unexpended balances at the close of the fiscal year 1909, exclusive of the unexpended appropriation for the payment of pensions, covered into the Treasury.

Salaries in bureau	$59,881.55
Salaries, per diem, and expenses special examiners	34,106.45
Fees, examining surgeons	189,353.36
Salaries and clerk hire, pension agencies	5,804.17
Rent, contingent expenses, and inspection of pension agencies	6,396.84
Total	295,542.37

The amount expended for navy pensions was $5,337,014.48. The law requires that the navy pensions shall be paid from the income of the navy pension fund so far as the same shall be sufficient for that purpose. The income from this fund for the fiscal year 1909 was $371,345.27, which was only about 7 per cent of the amount required for the payment of the navy pensions for the year. The interest on the navy pension fund has not been sufficient to pay the navy pensions since 1870.

Interest on the navy pension fund and the amounts paid for navy pensions for the past five years.

Fiscal year.	Interest.	Navy pensions.	Fiscal year.	Interest.	Navy pensions.
1909	$371,345	$5,337,014	1906	$363,619	$4,204,004
1908	360,409	4,934,350	1905	370,952	4,197,166
1907	361,405	4,248,712			

Exhibit 4 shows the amounts disbursed by each of the eighteen pension agencies during the fiscal year. The largest amount disbursed by any one agency was at Topeka, which amount was $18,669,850.74. The smallest amount was at Concord, which amount was $2,853,996.41. The total amount disbursed for pensions by pension agents was $161,883,599.35. In addition to this amount there was disbursed by the Treasury Department prior to March 4, 1909, in payment of

claims for reimbursement for expenses of the last sickness and burial of deceased pensioners, the sum of $90,104.42, making the total amount expended for pensions $161,973,703.77, as shown by Exhibit 3.

The amount expended for fees of examining surgeons, as shown by Exhibits 3 and 4, was $243,262.57. This, however, does not include the amount which will be required for the payment of the medical examinations held during the last quarter of the fiscal year. The unpaid accounts which are now being examined and prepared for payment will make a total expenditure for medical examinations held during the fiscal year 1909 of $310,646.64.

In the following table is presented a classification of the disbursements for pensions to each class of pensioners. The largest amount disbursed to any one class of pensioners was that to survivors of the civil war under the act of February 6, 1907, which was $58,383,177.88.

Classification of disbursements for pensions.

	Amount.	Total.
Regular establishment:		
Invalids	$2,101,797.19	
Widows, minors, and dependents	774,282.95	
		$2,876,080.14
Civil war:		
Act of February 6, 1907		58,383,177.88
General law—		
Invalids	34,637,978.20	
Nurses	71,629.00	
Widows, minors, and dependents	12,270,711.06	
		46,980,318.26
Act of June 27, 1890—		
Invalids	16,276,650.34	
Minors and helpless children	949,842.57	
		17,226,492.91
Act of April 19, 1908—		
Widows		30,278,825.35
War with Spain:		
Invalids	2,970,800.84	
Widows, minors, and dependents	849,368.96	
		3,820,169.80
War of 1812:		
Widows		62,731.60
War with Mexico:		
Survivors	620,659.98	
Widows	995,244.99	
		1,615,904.97
Indian wars:		
Survivors	198,335.84	
Widows	441,562.60	
		639,898.44
Treasury settlements		90,104.42
Grand total		161,973,703.77

PENSIONS OF THE SEVERAL WARS AND OF THE PEACE ESTABLISHMENT.

The amounts that have been paid for pensions to soldiers, sailors, and marines, their widows, minor children, and dependent relatives, on account of military and naval service since the foundation of the Government are as follows:

War of the Revolution (estimate)	$70,000,000.00
War of 1812 (service pension)	45,757,396.84
Indian wars (service pension)	9,995,609.47
War with Mexico (service pension)	42,492,784.07
Civil war	3,686,461,840.35
War with Spain and insurrection in the Philippine Islands	26,383,805.21
Regular establishment	15,507,028.02
Unclassified	16,484,049.77
Total disbursements for pensions	3,913,082,513.73

Exhibit 5 shows the number of pensioners, by classes, on the roll of each agency, together with the total number on the rolls June 30, 1909, and June 30, 1908. It will be observed that while the number of pensioners on the roll of the San Francisco agency one year ago was smaller than the number on the roll of either the Pittsburg or Buffalo agency, the number now exceeds that of either of the other two. Many pensioners are going to the Pacific Coast States from other agency districts. The name of a pensioner, however, is not transferred from one agency to another except upon his request filed in the bureau, and there are now more than 10,000 pensioners residing in California, Oregon, and Washington who formerly resided in other agency districts and who continue to draw their pensions each quarter from the agencies in the districts where they formerly resided.

The agency in Topeka, Kans., continues to be the largest of the entire eighteen. It has more pensioners than the two agencies in New York, or the two in Pennsylvania, or the three in New England combined. It has more than six times as many pensioners as are on the roll of either the Augusta or the Concord agency.

Exhibit 6 shows the number of pensioners in each State and Territory of the United States, each insular possession, and each foreign country on the roll June 30, 1909, together with amounts paid therein during the last fiscal year.

The largest number of pensioners in any one State at the close of the year was 92,507 in Ohio, and the largest amount paid on account of pensions in any one State during the year was $16,376,313.45 paid to the pensioners residing in that State.

Exhibit 7 shows, by classes, the number of pensioners on the roll at each rate at the close of the fiscal year 1909, except those pensioned by special acts of Congress.

Exhibit 8 shows, by classes, the number of pensioners on the roll under special acts of Congress at each rate at the close of the year.

The amount disbursed for pensions from July 1, 1790, to June 30, 1865, was $96,445,444.23. The amounts disbursed for pensions each year since the latter date, together with the expenses of administration of the pension laws, and the number of pensioners on the roll each year is shown by the following table:

Disbursements for pensions and for maintenance of pension system, 1866 to 1909.

Fiscal year.	Paid as pensions.	Cost, maintenance, and expenses.	Total.	Number of pensioners.
1866	$15,450,549.88	$407,165.00	$15,857,714.88	126,722
1867	20,784,789.69	490,977.35	21,275,767.04	155,474
1868	23,101,509.36	553,020.34	23,654,529.70	169,643
1869	28,513,247.27	564,526.81	29,077,774.08	187,963
1870	29,351,488.78	600,997.86	29,952,486.64	198,686
1871	28,518,792.62	863,079.00	29,381,871.62	207,495
1872	29,752,746.81	951,253.00	30,703,999.81	232,229
1873	26,982,063.89	1,003,200.64	27,985,264.53	238,411
1874	30,206,778.99	966,794.13	31,173,573.12	236,241
1875	29,270,404.76	982,695.35	30,253,100.11	234,821
1876	27,936,209.53	1,015,078.81	28,951,288.34	232,137
1877	28,182,821.72	1,034,459.33	29,217,281.05	232,104
1878	26,786,009.44	1,032,500.09	27,818,509.53	223,998
1879	33,664,428.92	837,734.14	34,502,163.06	242,755
1880	56,689,229.08	935,027.28	57,624,256.36	250,802
1881	50,583,405.35	1,072,059.64	51,655,464.99	268,830
1882	54,313,172.05	1,466,236.01	55,779,408.06	285,697
1883	60,427,573.81	2,591,648.29	63,019,222.10	303,658
1884	57,912,387.47	2,835,181.00	60,747,568.47	322,756
1885	65,171,937.12	3,392,576.34	68,564,513.46	345,125
1886	64,091,142.90	3,245,016.61	67,336,159.51	365,783
1887	73,752,997.08	3,753,400.91	77,506,397.99	406,007
1888	78,950,501.67	3,515,057.27	82,465,558.94	452,557
1889	88,842,720.58	3,466,968.40	92,309,688.98	489,725
1890	106,093,850.39	3,526,382.13	109,620,232.52	537,944
1891	117,312,690.50	4,700,636.44	122,013,326.94	676,160
1892	139,394,147.11	4,898,665.80	144,292,812.91	876,068
1893	156,906,637.94	4,867,734.42	161,774,372.36	966,012
1894	139,986,726.17	3,963,976.31	143,950,702.48	969,544
1895	139,812,294.30	4,338,020.21	144,150,314.51	970,524
1896	138,220,704.46	3,991,375.61	142,212,080.07	970,678
1897	139,949,717.35	3,987,783.07	143,937,500.42	976,014
1898	144,651,879.80	4,114,091.46	148,765,971.26	993,714
1899	138,355,052.95	4,147,517.73	142,502,570.68	991,519
1900	138,462,130.65	3,841,706.74	142,303,887.39	993,529
1901	138,531,483.84	3,868,795.44	142,400,279.28	997,735
1902	137,504,267.99	3,831,378.96	141,335,646.95	999,446
1903	137,759,653.71	3,993,216.79	141,752,870.50	996,545
1904	141,093,571.49	3,849,366.25	144,942,937.74	994,762
1905	141,142,861.33	3,721,832.82	144,864,694.15	998,441
1906	139,000,288.25	3,523,269.51	142,523,557.76	985,971
1907	138,155,412.46	3,309,110.44	141,464,522.90	967,371
1908	153,093,086.27	2,800,963.36	155,894,049.63	951,687
1909	161,973,703.77	2,852,583.73	164,826,287.50	946,194
Total	3,816,637,069.50	115,705,060.82	3,932,342,130.32	.....

The amount paid for pensions for the fiscal year 1909 was the largest ever disbursed for pensions in one year. The increase in the disbursements was, in a great measure, due to the large number of pensioners placed on the roll under the act of February 6, 1907, granting $12, $15, and $20 per month to survivors of the war with Mexico and the civil war on reaching the ages of 62, 70, and 75 years, respectively.

The increase is also due in part to pensions granted under the second section of the act of April 19, 1908, to widows of persons who served in the civil war, without regard to their pecuniary condition, and to the increase from $8 to $12 per month of the rate of pension of certain widows, minor children, and helpless minors granted by the first section of said act. The pensions of 202,577 widows, minor children, and helpless minors, on the roll when the act was passed, were immediately so increased without requiring the pensioners to make application therefor.

There was a slight increase in the cost of administration during the last year, as compared with the preceding year, on account of an increase of the fees of examining surgeons and the cost of supplies for the card-index system which is being installed in the bureau.

Addressing machines have been installed in a number of the pension agencies during the last year. By the use of these all the envelopes will be addressed to pensioners, and the names of pensioners, together with the certificate numbers and dates of issue, will be printed upon all vouchers. This will result in a great saving in clerical labor and a material reduction in the running expenses of the agencies. It will result also in greater accuracy, and will reduce to the minimum the number of errors in mailing checks and in the preparation of vouchers.

While, as heretofore shown, the amount paid on account of salaries during the year was $1,590,388.45, all this is not properly chargeable to the conduct of the bureau. There were 35 temporary clerks, borne on the roll of the bureau for various periods from July 1, 1908, to January 31, 1909, and paid from the appropriation for its clerical force, who were employed exclusively upon the work of the General Land Office. The salaries paid them while so employed aggregated $13,742.50.

There were also a number of the regular employees who, for the whole or a part of the year, were detailed for duty at the Capitol, in bureaus, or other offices. Their salaries while on such duty amounted to $11,930.22. Deducting these amounts, aggregating $25,672.72, from the $1,590,388.45 leaves $1,564,715.73 as the amount actually paid on account of salaries for work in the bureau.

Exhibit 9 is a statement of pension certificates issued during the year. The following summary shows the number of issues by classes:

Pension certificates issued during the fiscal year ended June 30, 1909.

Originals	45,088	Renewals	2,074
Increases	38,902	Supplementals	568
Additionals	128		
Reissues	36,835	Total	123,742
Restorations	147		

The different classes of certificates may be defined as follows:

Originals.—Cases in which no pension has before been granted.

Increases.—Cases in which increased rates are granted.

Additionals.—Issues under act of June 27, 1890, in lieu of pension under the general law.

Reissues.—Issues to allow for additional disabilities under the general law, to make corrections in former issues, and to allow pension under the general law and under the act of February 6, 1907, in lieu of pension under the act of June 27, 1890.

Restorations.—Issues to restore to the roll from date of last payment.

Renewals.—Issues to renew pension from a date when new title is shown.

Supplementals.—Cases in which title exists under different laws and issue is made under one law for a period not covered by the other issue.

The total number of pension certificates issued in the last ten years is as follows:

Pension certificates issued during last ten years.

1900	105,591	1905	185,242
1901	109,668	1906	136,905
1902	119,824	1907	236,516
1903	132,821	1908	328,676
1904	153,938	1909	123,742

It has been the practice of the bureau in former years in reporting the number of certificates issued to include the duplicates issued in lieu of certificates lost or destroyed, and also the allowances made on account of accrued pensions. As these, however, are not actual allowances of pensions, they can not properly be classed as pension certificates, and therefore have not been included in the report of certificates issued during the past year. There were 4,811 duplicate certificates issued, and allowances of accrued pension made in 26,737 cases, during the year.

While more pension certificates were issued during the fiscal year ended June 30, 1908, than in any former year in the history of the bureau, there were fewer issued last year than in any year since 1903. The number issued during 1908, exclusive of duplicates and accrued allowances, was 307,188, while the number issued last year was but 123,742.

The large decrease in the number of certificates issued is accounted for by the fact that at the beginning of the year, as shown by my report for last year, the work of the bureau was current and there were then only 102,330 claims, exclusive of claims for accrued pension, pending.

Exhibit 10 is a summary of the pending files of the bureau at the close of the year, arranged in such a way as to show not only the

number of claims of each class on file, but also the number of claims of each class based upon disabilities incurred, or service rendered, in each of the wars and in the regular establishment.

The total number of applications for pension of all kinds pending at the close of the year was 66,226, as against 102,330 (exclusive of claims for accrued pension) pending at the beginning of the year, and as the work of the bureau is now kept current these claims are being adjudicated as rapidly as the evidence necessary to determine their merits is furnished.

A recapitulation of the pending claims is as follows:

Claims pending at close of fiscal year ended June 30, 1909.

Civil war	46,375	Old wars	18
War with Spain	15,413	Regular establishment	4,020
Mexican war	210		
Indian wars	190	Total	66,226

In addition to pension claims, as above noted, there were pending before the bureau June 30, 1909, 27 applications for military bounty and warrants.

SPECIAL ACTS.

Since 1861 there have been granted by special acts of Congress 26,337 pensions and increases of pensions, of which 16,407 are now on the roll with an annual face value of $4,846,126.

Only a little more than one-half of said amount is properly chargeable to special acts, as most of the beneficiaries had been previously pensioned under general laws at lower rates.

During the second session of the Sixtieth Congress 3,021 persons were included in the special acts passed, at the rates specified in the following summary:

Pensions granted by special acts during the second session of the Sixtieth Congress.

Rates specified.	Number granted.	Rates specified.	Number granted.
$72	1	$10	4
$60	4	$8	7
$50	48	$6	2
$46	1	Repealed	1
$40	76	Rate undetermined	1
$36	109	Inoperative:	
$35	2	$40	1
$30	956	$36	1
$25	13	$35	1
$24	1,251	$30	13
$20	154	$24	13
$18	1	$20	2
$17	6	$12	3
$16	78		
$15	6	Total	3,021
$12	266		

Of the above, 296 were granted to persons never before on the pension roll and 2,725 to persons then receiving smaller pensions.

The annual value of said special acts is $919,908, and the annual increase in payments of pension due to such acts is $454,722.

ORDER 78.

Order 78, issued March 15, 1904, provided that in the adjudication of claims for pension under the act of June 27, 1890, as amended by the act of May 9, 1900, it should be taken and considered as an evidential fact, if the contrary did not appear, that when a claimant had passed the age of 62 years he would be disabled one-half in ability to perform manual labor, and, if all other legal requirements were properly met, would be entitled to be rated at $6 per month; after 65 years, at $8 per month; after 68 years, at $10 per month; and after 70 years, at $12 per month.

From April 13, 1904, the date this order took effect, until June 30, 1909, the number of allowances thereunder was as follows: Originals, 24,625; increases, 84,296; total, 108,921. These allowances were rated as follows:

Claims allowed under Order 78 from April 13, 1904, to June 30, 1909.

ORIGINALS.

At $6 per month	14,487
At $8 per month	5,406
At $10 per month	1,766
At $12 per month	2,966

INCREASES.

From $6 to $8 per month	18,921
From $6 to $10 per month	3,748
From $6 to $12 per month	3,913
From $8 to $10 per month	19,225
From $8 to $12 per month	11,409
From $10 to $12 per month	27,080
Total	108,921

Order 78 has been substantially superseded by the act of February 6, 1907, and very few, if any, claims will hereafter be adjudicated thereunder. There were but 76 original and 79 increase claims adjudicated under this order during the fiscal year ended June 30, 1909.

ACT OF FEBRUARY 6, 1907.

The act of February 6, 1907, grants pensions to persons who served ninety days or more in the military or naval service of the United States during the civil war, or sixty days in the Mexican war, and were honorably discharged, at rates as follows: Twelve dollars per month when 62 years of age; $15 per month when 70 years of age; and $20 per month when 75 years of age.

From the date of its approval to June 30, 1909, 501,242 applications for pension or increase of pension were filed under this act. Some of these, however, were duplicates of former ones filed by the same persons, and did not constitute separate claims. During the past year

claims under this law have been adjudicated as rapidly as they were completed, and at the end of the year there were only 8,929 such claims pending.

The following is a statement of the number of certificates issued under this law each month since its passage:

Certificates issued under act of February 6, 1907.

1907—February	1,108	1908—January	33,071	1908—December	5,156
March	15,278	February	25,302	1909—January	5,605
April	28,465	March	16,048	February	5,230
May	36,588	April	9,244	March	4,522
June	37,898	May	6,422	April	7,684
July	23,955	June	5,985	May	5,717
August	23,173	July	5,532	June	4,954
September	15,415	August	4,869		
October	35,451	September	4,570	Total	444,411
November	33,742	October	7,928		
December	30,047	November	5,452		

Of the above, only 16,324 were original allowances, or certificates issued to persons who were not already on the pension roll.

The following table shows the ages, at the dates the claims were allowed, of the survivors of the civil war and of the war with Mexico who have been granted pensions under the act of February 6, 1907. The number of survivors in this table does not agree with the number of certificates issued, for the reason that increase issues were included under the certificates, while they were omitted in tabulating the number at the various ages. There were also some claims allowed on June 30 which were included in the table of ages, though not included in certificates issued, as the certificates could not be written until July 1.

Survivors of Mexican and civil wars, by ages.

Age.	Number of survivors.		Age.	Number of survivors.	
	Civil war.	Mexican war.		Civil war.	Mexican war.
62	87,424	.....	83	1,445	225
63	34,350	.....	84	1,164	174
64	31,219	.....	85	836	121
65	26,239	.....	86	729	72
66	25,041	.....	87	408	51
67	19,053	.....	88	261	38
68	14,620	.....	89	124	21
69	8,385	.....	90	82	13
70	47,899	.....	91	47	8
71	16,552	3	92	40	4
72	14,384	1	93	22	2
73	12,173	4	94	16	2
74	7,369	17	95	4	.....
75	15,843	68	96	6	.....
76	8,575	130	97	5	.....
77	6,180	187	98	7	.....
78	5,039	265	103	1	.....
79	4,000	344	107	1	.....
80	3,769	415	108	1	.....
81	2,379	369			
82	2,074	368	Total	397,766	2,902

ACT OF APRIL 19, 1908.

The first section of the act of April 19, 1908, increased to $12 per month the rate of pension of widows, minor children, and helpless minors for whom the laws then existing provided a less rate.

The second section of the act grants pensions at the rate of $12 per month to the widows of persons who served ninety days or more in the army or navy of the United States during the civil war, and who were honorably discharged, without regard to their pecuniary condition, provided they were married prior to June 27, 1890.

The conditions of title under this act being the same as those imposed upon widows by the act of June 27, 1890, with the exception that the requirements as to dependence are eliminated, it has superseded the act of 1890 in so far as the claims of widows are concerned.

The records show that 46,636 applications under this law were filed prior to July 1, 1909, and that up to that time 31,394 certificates had been issued thereunder.

TEN YEARS' SUMMARY.

The following table shows the operations of the bureau in the adjudication of pension claims each year for the past ten years. "No benefit cases" are allowances under one law when the claimants are already in receipt of pension at an equal or higher rate under another law. As two pensions under different laws can not be paid to the same person covering the same period, the applicant in a case of this kind is permitted to elect which pension he will receive.

It should be stated that the number of applications filed during each year is not the exact number of separate or distinct claims filed. It is very frequently found, upon an examination of the papers, that a declaration is a duplicate of a former application filed by the same person, and hence it is not considered or adjudicated as a separate claim.

Summary of work for ten years ending June 30, 1909.

Year.	Cases on hand.	Office force.	Applications filed.	Admissions.	Rejections.	No benefit cases.	Total number of cases adjudicated.
1900	437,104	1,741	181,005	102,596	116,129	8,000	226,725
1901	403,569	1,741	219,179	106,990	110,254	9,836	227,080
1902	339,436	1,741	188,626	117,268	118,464	10,441	246,173
1903	304,809	1,736	225,871	130,109	113,794	8,203	252,106
1904	285,523	1,734	254,333	151,211	108,114	8,725	268,050
1905	220,822	1,709	217,435	182,207	81,853	4,915	268,975
1906	182,453	1,684	201,322	138,809	82,938	4,943	226,690
1907	356,181	1,534	440,517	238,249	60,573	3,892	302,715
1908	123,483	1,464	185,622	325,140	59,449	3,403	387,992
1909	66,226	1,385	152,009	123,610	52,199	1,772	177,581

BOUNTY-LAND WARRANTS.

During the fiscal year 10 original military bounty-land warrants were issued, granting 1,560 acres of land, and duplicates of two 120-acre and one 80-acre warrants lost or destroyed were also issued. Service to give title to bounty land must have been for at least fourteen days, or in a battle, prior to March 3, 1855; and if in the navy or Regular Army must have been in some war in which the United States Government was engaged.

The following statement shows the total number of bounty-land warrants of all classes issued by the bureau (including partial estimate of those issued for service in the Revolutionary war) and the number of acres granted up to June 30, 1909:

Bounty-land warrants issued to June 30, 1909.

Grade of warrants.	Number.	Acres.	Remarks.
War of the Revolution, acts prior to 1800	16,663	2,666,080	Estimate average 160 acres.
War of 1812, acts prior to 1850	29,471	4,891,520	1,101 320-acre warrants included.
Total	46,134	7,557,600	
Mexican war, act of 1847:			
160 acres	80,689	12,910,240	This statement does not include 2,726 $100 Treasury certificates issued in lieu of 160-acre warrants and 460 $25 certificates in lieu of 40-acre warrants; in all, 454,560 acres.
40 acres	7,585	303,400	
Total	88,274	13,213,640	
1812, Mexican, and Indian wars, act of 1850:			
160 acres	27,450	4,392,000	
80 acres	57,717	4,617,360	
40 acres	103,978	4,159,120	
Total	189,145	13,168,480	
Act of 1852:			
160 acres	1,223	195,680	Superseded by act of 1855.
80 acres	1,699	135,920	
40 acres	9,070	362,800	
Total	11,992	694,400	
Act of 1855:			
160 acres	115,640	18,502,400	
120 acres	97,091	11,650,920	
100 acres	6	600	
80 acres	49,490	3,959,200	
60 acres	359	21,540	
40 acres	542	21,680	
10 acres	5	50	
Total	263,133	34,156,390	

SUMMARY.

War of the Revolution	16,663	2,666,080	Now obsolete.
War of 1812	29,471	4,891,520	Do.
Act of 1847	88,274	13,213,640	
Act of 1850	189,145	13,168,480	
Act of 1852	11,992	694,400	Superseded by act of 1855.
Act of 1855	263,133	34,156,390	
Total	598,678	68,790,510	

This bureau has no record of the warrants issued directly from the General Land Office under special acts of Congress, or of those issued on account of the Virginia military land grants satisfied by the United States after the cession of the Northwestern Territory, and they are not included in the above table.

ATTORNEYS.

The following statement shows the number of attorneys admitted to practice before the bureau and the changes in the roll of recognized attorneys during the fiscal year 1909:

Attorneys recognized July 1, 1908, and July 1, 1909.

Attorneys on roll July 1, 1908	25,039
Attorneys gained by enrollment	446
Attorneys gained by restoration	23
Loss by death, etc	87
Loss by disbarment and suspension	15
Loss by relinquishment while under charges	7
Attorneys on roll July 1, 1909	25,399
Paid as attorneys' fees during the year	$321,237.86
There was paid as such fees during 1908	$264,522.46

Attorneys' fees are paid by the pension agents upon the order of the bureau out of first payments due pensioners after the allowance of their claims, the amount of such fees being regulated by the pension laws. The average payment of fees to the entire bar for the year was about $12 to each attorney. The marked increase in the amount of attorneys' fees paid is due to claims filed and allowed under the act of April 19, 1908.

CRIMINAL PROSECUTIONS.

The number of new cases presented by the bureau to the Department of Justice for prosecution on account of offenses against the pension laws and the number of indictments found show a marked and gratifying decrease over last year.

There were 70 cases brought to trial during the year, in 65 of which convictions were secured. Only 8 of these were cases against persons who rendered military or naval service.

The effort made by the bureau to maintain the integrity of the pension roll is shown by the following statement:

Prosecutions for offenses against the pension laws.

New cases presented for prosecution	106
Indictments found	90
Convictions secured	65
Sentences imposed	56
Acquittals	5
Cases dismissed	44
Civil suits instituted	2
Money recovered	$4,571

The offenses for which convictions were obtained were as follows:

False affidavit	6
False certificate	1
False claim	2
False declaration	5
False expense account	1
False jurat	13
False pretense	1
False voucher	2
Forged affidavit	8
Forged check	4
Forged declaration	1
Forged voucher	2
Perjury	3
Personating soldier	9
Personating sailor	1
Personating special examiner	2
Illegal fees	4
Total	65

There were 156 cases pending in the hands of United States attorneys on June 30, 1909. Two civil suits were instituted and 2 were disposed of during the fiscal year, leaving 7 pending. The 2 cases disposed of resulted in judgments for the United States aggregating $5,298.53.

Money recovered from all sources amounted to $4,571.23.

REIMBURSEMENT CLAIMS.

The act making appropriations for the payment of invalid and other pensions of the United States for the fiscal year ending June 30, 1910, and for other purposes, approved March 4, 1909, contains the following provision: "*And provided further,* That hereafter the settlement of all claims for the reimbursement of expenses of the last sickness and burial of deceased pensioners shall be under the direction of the Commissioner of Pensions." Prior to the passage of said act, all such claims were adjudicated by the Auditor for the Interior Department. Upon the passage of this act the claims then pending in his office (1,786) were forwarded by the auditor to this bureau for settlement. The number of such claims filed in this bureau directly, between March 4 and June 30, 1909, was 2,341. The number allowed by the bureau prior to July 1, 1909, was 1,434, the number disallowed was 225, and 53 were abandoned. At the close of the year there were 2,415 such claims pending. These are now being settled as fast as the evidence is furnished to complete them, and the number of pending claims is being rapidly reduced.

EXAMINING SURGEONS.

Most of the surgeons appointed to make examinations of applicants for pension, or increase of pension, are organized into boards of three members each. In addition to the boards, it is sometimes necessary to have single surgeons or specialists make examinations of claimants who can not go before a board, or who require the attention of a specialist. These surgeons are not under civil-service rules. Examinations in foreign countries are made by surgeons designated by United States consuls. On June 30, 1909, there were 4,637 examining surgeons, and during the year 40,524 examinations were made, at an expense of $310,646.64.

REVOLUTIONARY WAR.

Mrs. Phoebe M. Palmeter, aged 88 years, of Brookfield, N. Y., pensioned by a special act of Congress as the daughter of Jonathan Wooley, who served in a New Hampshire company, is the only pensioner on account of the Revolutionary war remaining on the roll.

The last widow pensioner of that war was Esther S. Damon, of Plymouth Union, Vt., who died November 11, 1906, aged 92 years. The last survivor of the war of the Revolution was Daniel F. Bakeman, who died at Freedom, Cattaraugus County, N. Y., April 5, 1869, aged 109 years 6 months and 8 days.

WAR OF 1812.

The last surviving pensioned soldier of the war of 1812 was Hiram Cronk, of Ava, N. Y., who died May 13, 1905, aged 105 years and 16 days. The names of 395 widows of the war of 1812 remained on the pension roll June 30, 1909.

MISCELLANEOUS.

The mail received during the year, including applications for pension, numbered 2,138,719 pieces, and the outgoing mail aggregated 1,826,252 pieces, making a total of 3,964,971 pieces handled, an average of about 13,000 daily.

During the year 177,581 pension claims were adjudicated, of which 123,610 were admitted, 52,199 rejected, and 1,772 approved for allowance in which no certificates were issued because they would not have been of benefit to the applicants. Many of the claims rejected were applications for increase, in which, on medical examination, no increase of disability was shown. There were also 88 claims for military bounty-land warrants adjudicated during the year, of which 12 were allowed and 76 rejected.

Out of 5,752 appeals from the action of the bureau, decided by the department during the year, the bureau was reversed in only 264 cases, being 4.59 per cent of the cases decided.

The act of December 21, 1893, requires the bureau to give a notice of thirty days to pensioners before reducing their pensions or dropping their names from the roll. During the year 621 pensioners were dropped from the roll under this act, for various causes, the pensions of 51 persons were reduced, and reissues were made in 79 cases to recover erroneous payments.

The act of March 3, 1899, provides for dividing of pensions of resident pensioners of the United States who shall desert their wives or minor children, or who are inmates of national or state soldiers' and sailors' homes. Since the passage of this act 10,178 original claims have been filed thereunder, and 1,767 claims have been renewed, making a total of 11,945 claims. Of these, 6,198 have been allowed and 5,518 rejected; leaving 229 pending on June 30, 1909.

During the year there were received in the bureau 152,009 new applications for pension or increase of pension. There were also received 7,161 applications for accrued pension due at death of pensioners, 4,127 applications for reimbursement of the expenses of the last sickness and burial of deceased pensioners, and 68 applications for military bounty-land warrants.

The number of cases for special examination on hand July 1, 1908, was 3,936, and the number referred for examination during the year was 8,261, making a total of 12,197. Of these, 8,711 were disposed of during the year, leaving 3,486 on hand June 30, 1909. The average number of special examiners employed was 136, and the average number of cases disposed of per examiner was 64. The appropriation act for the year provided for 100 special examiners; but this force was augmented from time to time as the work required by details from the clerical force of the bureau, as authorized by law.

The work of card indexing the records of the bureau has been continued during the year, as large a force being engaged thereon as was available and as could work to advantage upon the records. A total of 1,707,176 cards have been written and placed in proper files for future use and reference. It is believed that the card index when completed will be of much benefit to the bureau, and will greatly facilitate the searching of the records.

From 1900 to 1904, inclusive, the number of certificates of pension issued was	621,842
From 1905 to 1909, inclusive, the number issued (not including 202,577 increases under the act of April 19, 1908, made, by my directions to the pension agents, on the original certificates of the pensioners, in order to save the pensioners the trouble and expense of filing applications therefor) was	1,011,082
An increase of	389,240
From 1900 to 1904, inclusive, there was paid as pensions	$693,351,107.68
From 1905 to 1909, inclusive	733,365,352.08
An increase of	40,014,244.40
The operating expenses of the bureau from 1900 to 1904, inclusive, were	19,384,464.18
From 1905 to 1909, inclusive	16,207,759.86
A decrease of	3,176,704.32

Very respectfully,

VESPASIAN WARNER,
Commissioner of Pensions.

The SECRETARY OF THE INTERIOR.

EXHIBIT 1.—*Pensioners added to and dropped from the roll during the year, and the annual value of the pension of each class on the roll June 30, 1909.*

Classes.	Pensioners on the roll at the beginning of the year.	Pensioners added to the roll.			Pensioners added to classes by transfer from other classes.					Total pensioners added to classes during the year.	Grand total.	Actual loss to the roll during the year.					Loss to one class by allowance under another class to the same person.	Total loss to the roll.	Pensioners on the roll at the close of the year.	Annual value.
		Original.	Restoration.	Renewal.	Original.	Restoration.	Renewal.	Additional.	Reissue.			By death.	By remarriage.	Minors by legal limitation.	By failure to claim.	By other causes.				
Regular establishment.																				
Army:																				
Invalids	9,410	795	5	6	....	.....	.....	.....	2	808	10,218	305	.....	.....	22	25	32	384	9,384	$1,607,811.00
Widows, etc	2,496	228	.....	2	2	.....	.....	.....	.....	232	2,688	99	21	14	2	.....	.....	136	2,552	541,588.00
Navy:																				
Invalids	2,376	345	2	7	4	.....	.....	.....	1	359	2,735	105	.....	.....	8	16	14	143	2,592	453,180.06
Widows, etc	1,266	114	.....	.....	.....	.....	.....	.....	1	115	1,381	45	12	3	2	1	.....	63	1,318	277,836.00
Civil war.																				
Act of Feb. 6, 1907:																				
Army	325,896	4,687	7	92	3	1	25	.....	34,280	39,095	364,990	18,135	.....	.....	1	86	1,630	19,852	345,138	58,290,984.00
Navy	12,446	381	.....	2	1	.....	.....	.....	1,115	1,499	13,945	728	.....	.....	.....	4	36	768	13,177	2,168,868.00
General law:																				
Army—																				
Invalids	140,703	45	17	16	2	5	1,067	.....	1,697	2,849	143,552	7,272	.....	.....	44	17	6,383	13,716	129,836	33,667,298.50
Nurses	510	8	.....	.....	.....	.....	.....	.....	.....	8	518	40	.....	.....	.....	.....	.....	40	478	70,764.00
Widows, etc	80,054	1,382	20	599	2	.....	5	.....	128	2,136	82,190	4,629	256	159	55	22	4	5,125	77,065	11,876,664.00
Navy—																				
Invalids	1,341	.....	.....	2	.....	.....	9	.....	46	57	1,398	104	.....	.....	1	.....	64	169	1,229	324,654.00
Widows, etc	1,116	10	.....	4	.....	.....	.....	.....	2	16	1,132	57	1	1	.....	.....	.....	59	1,073	183,276.00
Act of June 27, 1890:																				
Army—																				
Invalids	135,605	882	19	19	....	.....	6	91	1	1,018	136,623	6,238	.....	.....	160	176	29,133	35,707	100,916	13,501,002.00
Minors, etc	4,117	882	3	9	.....	.....	.....	.....	.....	894	5,011	56	.....	733	14	18	3	824	4,187	761,384.00
Navy—																				
Invalids	4,995	107	1	2	.....	.....	.....	1	.....	111	5,106	354	.....	.....	14	8	1,065	1,441	3,665	477,417.00
Minors, etc	132	35	.....	.....	.....	.....	.....	.....	.....	35	167	1	.....	20	.....	.....	.....	21	146	23,808.00
Act of Apr. 19, 1908:																				
Army widows	180,402	31,614	20	131	....	1	.....	.....	5	31,771	212,173	7,771	669	.....	167	193	137	8,937	203,236	29,556,480.00
Navy widows	8,043	885	.....	8	.....	.....	.....	.....	.....	893	8,936	352	21	.....	10	4	4	391	8,545	1,240,848.00

War with Spain.																				
Army:																				
Invalids	19,857	1,749	26	53						1,828	21,685	271			27	122	1	421	21,264	2,517,886.00
Widows, etc	4,840	241		4						245	5,085	160	40	32	2	6		240	4,845	763,284.00
Navy:																				
Invalids	691	33							1	34	725	16			4	2		22	703	103,889.76
Widows, etc	277	17								17	294	5	5	1				11	283	51,552.00
War of 1812.																				
Widows	471	1								1	472	75			2			77	395	59,124.00
War with Mexico.																				
Survivors	2,932	3	1	1	1					6	2,938	473			6			479	2,459	584,364.00
Widows	6,914	267								267	7,181	521	17		6	4		548	6,633	958,056.00
Indian wars.																				
Survivors	1,820	137								137	1,957	210			3			213	1,744	185,748.00
Widows	3,018	162					1			162	3,181	290	7		1	2		300	2,881	435,104.00
Total	951,687	45,010	121	957	15	7	1,113	92	37,279	84,594	1,036,281	48,312	1,049	963	551	706	38,506	90,087	946,194	160,682,870.32

EXHIBIT 2.—*Number and amount of first payments in original, increase, reissue, restoration, and other cases made during the fiscal year ended June 30, 1909.*

Class.	Original.		Increase and reissue.		Supplemental.		Additional.		Restoration and renewal.		Total.	
	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.
Regular establishment:												
Army—invalids	781	$83,930.77	626	$24,532.29					5	$489.07	1,412	$108,952.13
Army—widows, etc.	213	34,112.29	14	1,375.50	2	$460.20			2	106.20	231	36,054.19
Navy—invalids	342	27,088.15	112	7,934.88					21	277.68	475	35,360.71
Navy—widows, etc.	112	13,261.77	12	1,203.66							124	14,465.43
Civil war; act February 6, 1907:												
Army	4,742	206,731.27	56,513	1,804,051.94	13	221.13			194	7,901.40	61,462	2,018,905.74
Navy	376	18,576.36	2,105	78,461.65					3	157.80	2,484	97,195.81
Civil war; general law:												
Army—invalids	60	10,182.21	11,987	491,324.18	32	19,437.87			1,093	58,602.43	13,172	579,546.69
Army—nurses	7	160.00	2	83.20							9	243.20
Army—widows, etc.	1,462	255,934.60	244	19,580.80	14	1,683.21			573	66,667.04	2,293	343,865.65
Navy—invalids			89	4,740.46					7	253.83	96	4,994.29
Navy—widows, etc.	11	783.40	6	1,506.70					5	406.60	22	2,696.70
Civil war; act June 27, 1890:												
Army—invalids	921	145,650.56	2,453	63,154.89	128	32,152.92	115	$10,393.16	69	14,414.71	3,686	265,766.24
Army—minors, etc.	815	182,769.59	7	448.07	30	3,163.86			10	1,686.17	862	188,067.69
Navy—invalids	106	13,028.16	107	3,545.02	9	1,924.80	1	2.07	2	595.53	225	19,095.58
Navy—minors, etc.	33	7,800.54									33	7,800.54
Civil war; act April 19, 1908:												
Army	32,426	1,968,820.84	153	7,024.39	182	33,427.29			103	9,947.26	32,864	2,019,219.78
Navy	956	66,918.80	10	745.13	13	4,405.47			7	765.20	986	72,834.60
War with Spain:												
Army—invalids	1,758	433,399.77	1,282	43,662.62					79	10,031.48	3,119	487,093.87
Army—widows, etc.	248	56,263.50	1	48.00					3	102.00	252	56,413.50
Navy—invalids	33	6,492.92	33	1,247.80							66	7,740.72
Navy—widows, etc.	17	3,803.19									17	3,803.19
War of 1812—widows	2	2,615.60	3	173.33							5	2,788.93
War with Mexico—survivors	6	1,966.93	51	2,270.04	1	39.33			8	265.72	66	4,542.02
War with Mexico—widows	266	50,001.02	9	1,412.26					1	1,010.00	276	52,423.28
Indian wars—survivors	128	22,373.61	113	4,256.99					3	102.14	244	26,732.74
Indian wars—widows	152	32,838.57	1	34.94							153	32,873.51
Total	45,973	3,645,504.42	75,933	2,562,818.74	424	96,916.08	116	10,395.23	2,188	173,782.26	124,634	6,489,416.73

EXHIBIT 3.—*Appropriations for pensions and disbursements on account thereof for the fiscal year ended June 30, 1909, and unexpended balances at close of year.*

Items of appropriation.	Appropriations.			Disbursements.			Balances.		
	Amount appropriated act May 28, 1908.	Repayments to the appropriation.	Total.	Amount disbursed by United States pension agents.	Amount disbursed by Treasury settlements.	Total amount disbursed.	Balance remaining in hands of United States pension agents June 30, 1909.	Balance remaining in United States Treasury June 30, 1909.	Available balance June 30, 1909.
Army pensions	$156,650,000.00	$2,782.47	$156,652,782.47	$156,550,514.15	$86,175.14	$156,636,689.29	$15,816.45	$276.73	$16,093.18
Navy pensions	5,350,000.00	207.70	5,350,207.70	5,333,085.20	3,929.28	5,337,014.48	11,586.50	1,606.72	13,193.22
Total	162,000,000.00	2,990.17	162,002,990.17	161,883,599.35	90,104.42	161,973,703.77	27,402.95	1,883.45	29,286.40
Fees of examining surgeons, pensions	500,000.00	.....	500,000.00	243,262.57	.....	243,262.57	131,737.43	125,000.00	256,737.43
Salaries and expenses of pension agents:									
Salaries, pension agents	72,000.00	.....	72,000.00	72,000.00	.....	72,000.00	.....	.....	.....
Clerk hire, pension agencies	410,000.00	17.17	410,017.17	404,213.00	.....	404,213.00	5,804.17	.....	5,804.17
Rent, for pension agency at New York, N. Y.	4,500.00	.....	4,500.00	4,500.00	.....	4,500.00	.....	.....	.....
Examinations, pension agencies	1,500.00	.....	1,500.00	.....	.....	.....	.....	1,500.00	1,500.00
Contingent expenses, pension agencies	65,000.00	24.01	65,024.01	21,759.89	21,521.67	43,281.56	10,564.12	11,178.33	21,742.45
Total	553,000.00	41.18	553,041.18	502,472.89	21,521.67	523,994.56	16,368.29	12,678.33	29,046.62
Grand total	163,053,000.00	3,031.35	163,056,031.35	162,629,334.81	111,626.09	162,740,960.90	175,508.67	139,561.78	315,070.45

In addition to the above there were disbursed during the fiscal year ended June 30, 1909, the following sums chargeable to the appropriation for the fiscal year ended June 30, 1908:

Fees of examining surgeons, pensions at Washington, D. C.	$73,311.98
Fees of examining surgeons, pensions by Treasury settlements	916.17
Total	74,228.15

Of the amount $5,337,014.48 disbursed for navy pensions, $371,345.27 was paid from the navy pension fund under act May 28, 1908.

EXHIBIT 4.—*Amount disbursed at United States pension agencies during the fiscal year ended June 30, 1909, as shown by accounts current.*

Agency.	Pensions.			Fees of examining surgeons, pensions.	Salaries.	Clerk hire.	Rent.	Contingent expenses.	Grand total.
	Army.	Navy.	Total.						
Augusta	$2,979,848.86	.....	$2,979,848.86	.....	$4,000.00	$8,148.33	.....	$339.11	$2,992,336.30
Boston	8,399,919.46	$1,137,924.44	9,537,843.90	.....	4,000.00	23,244.00	.....	1,134.84	9,566,222.74
Buffalo	7,118,747.85	.....	7,118,747.85	.....	4,000.00	20,012.50	.....	2,536.31	7,145,296.66
Chicago	11,566,326.96	1,043,077.18	12,609,404.14	.....	4,000.00	29,323.06	.....	357.66	12,643,084.86
Columbus	16,533,325.37	.....	16,533,325.37	.....	4,000.00	36,829.54	.....	4,928.90	16,579,083.81
Concord	2,841,925.72	.....	2,841,925.72	.....	4,000.00	7,954.34	.....	116.35	2,853,996.41
Des Moines	9,018,465.90	.....	9,018,465.90	.....	4,000.00	22,909.33	.....	364.57	9,045,739.80
Detroit	7,022,000.00	.....	7,022,000.00	.....	4,000.00	17,999.33	.....	589.54	7,044,588.87
Indianapolis	11,001,797.50	.....	11,001,797.50	.....	4,000.00	23,457.00	.....	205,34	11,029,459.84
Knoxville	10,205,059.07	.....	10,205,059.07	.....	4,000.00	26,362.16	.....	353.77	10,235,775.00
Louisville	4,372,048.02	.....	4,372,048.02	.....	4,000.00	12,197.33	.....	184.89	4,388,430.24
Milwaukee	8,350,076.36	.....	8,350,076.36	.....	4,000.00	20,210.50	.....	462.28	8,374,749.14
New York	7,755,393.37	1,049,850.38	8,805,243.75	.....	4,000.00	23,994.75	$4,500.00	658.92	8,838,397.42
Philadelphia	8,605,086.56	667,169.96	9,272,256.52	.....	4,000.00	24,538.83	.....	2,864.94	9,303,660.29
Pittsburg	7,350,221.17	.....	7,350,221.17	.....	4,000.00	19,870.00	.....	409.81	7,374,500.98
San Francisco	6,840,010.79	327,006.73	7,167,017.52	.....	4,000.00	20,257.17	.....	2,692.49	7,193,967.18
Topeka	18,625,078.00	.....	18,625,078.00	.....	4,000.00	40,504.83	.....	267.91	18,669,850.74
Washington	7,965,183.19	1,108,056.51	9,073,239.70	$243,262.57	4,000.00	26,400.00	.....	3,292.26	9,350,194.53
Total	156,550,514.15	5,333,085.20	161,883,599.35	243,262.57	72,000.00	404,213.00	4,500.00	21,759.89	162,629,334.81

EXHIBIT 5.—*Number of pensioners, by classes, on the rolls of each agency, together with the total number on the rolls June 30, 1909 and 1908.*

Agency.	Regular establishment.				Civil war.									
					Act Feb. 6, 1907.		General law.					Act June 27, 1890.		
	Army.		Navy.				Army.			Navy.		Army.		Navy.	
	Invalids.	Widows, etc.	Invalids.	Widows, etc.	Army.	Navy.	Invalids.	Nurses.	Widows, etc.	Invalids.	Widows, etc.	Invalids.	Minors, etc.	Invalids.	Minors, etc.
Augusta	82	37	.....	.....	6,118	.....	3,545	3	2,064	.....	.....	1,455	52	.....	.....
Boston	317	148	292	186	23,265	3,048	3,565	31	4,859	303	351	3,058	148	562	28
Buffalo	290	102	.....	.....	15,396	.....	6,803	17	4,844	.....	.....	5,066	106	.....	.....
Chicago	479	89	541	151	26,079	2,471	9,998	43	6,149	440	257	7,594	310	991	28
Columbus	585	126	.....	.....	30,874	.....	18,109	35	9,862	.....	.....	11,040	313	.....	.....
Concord	78	21	.....	.....	4,979	.....	3,441	2	2,239	.....	.....	1,177	42	.....	.....
Des Moines	325	52	.....	.....	21,860	.....	8,285	36	4,027	.....	.....	6,026	180	.....	.....
Detroit	314	74	.....	.....	13,049	.....	8,146	12	4,113	.....	.....	4,611	142	.....	.....
Indianapolis	574	72	.....	.....	15,004	.....	17,162	32	7,658	.....	.....	5,333	266	.....	.....
Knoxville	962	279	.....	.....	22,799	.....	4,824	25	3,054	.....	.....	8,573	617	.....	.....
Louisville	450	124	.....	.....	8,222	.....	3,504	7	2,464	.....	.....	3,197	253	.....	.....
Milwaukee	348	85	.....	.....	20,244	.....	7,169	28	3,945	.....	.....	4,978	190	.....	.....
New York	592	297	479	257	19,399	2,751	3,294	22	3,642	148	168	3,167	116	573	23
Philadelphia	343	152	280	177	21,458	1,666	4,303	21	3,784	113	131	4,854	192	318	19
Pittsburg	169	51	.....	.....	16,724	.....	5,102	12	3,105	.....	.....	5,136	134	.....	.....
San Francisco	885	185	280	52	19,066	917	3,473	44	1,628	50	21	4,678	177	269	8
Topeka	955	151	.....	.....	44,080	.....	14,168	48	6,376	.....	.....	15,013	682	.....	.....
Washington	2,086	507	720	495	16,522	2,324	4,945	60	3,252	175	145	5,960	267	952	40
Total	9,834	2,552	2,592	1,318	345,138	13,177	129,836	478	77,065	1,229	1,073	100,916	4,187	3,665	146

EXHIBIT 5.—*Number of pensioners, by classes, on the rolls of each agency, together with the total number on the rolls June 30, 1909 and 1908*—Cont'd.

Agency.	Civil war. Act Apr. 19, 1908.		War with Spain.				War of 1812, widows.	War with Mexico.		Indian wars.		Number of pensioners.	Number of pensioners.
			Army.		Navy.								
	Army, widows.	Navy, widows.	Invalids.	Widows, etc.	Invalids.	Widows, etc.		Survivors.	Widows.	Survivors.	Widows.	June 30, 1909.	June 30, 1908.
Augusta	2,751	.....	253	43	.....	.....	11	9	30	.....	2	16,455	16,718
Boston	14,813	2,098	658	392	94	39	11	21	93	5	15	58,400	58,499
Buffalo	9,188	.....	739	204	.....	.....	32	23	54	1	8	42,873	43,536
Chicago	14,329	1,376	1,326	269	142	35	23	179	464	10	78	73,851	73,787
Columbus	19,482	.....	2,246	342	.....	.....	31	97	239	6	10	93,397	93,969
Concord	2,972	.....	311	59	.....	.....	7	2	27	.....	1	15,358	15,633
Des Moines	10,344	.....	964	151	.....	.....	6	103	218	12	29	52,618	52,207
Detroit	7,357	.....	1,285	219	.....	.....	6	31	71	2	6	39,438	39,964
Indianapolis	10,208	.....	1,899	171	.....	.....	13	111	308	2	17	58,830	59,504
Knoxville	12,978	.....	2,204	659	.....	.....	112	669	2,183	604	1,807	62,349	63,030
Louisville	5,713	.....	971	230	.....	.....	13	111	362	5	13	25,639	26,143
Milwaukee	9,610	.....	1,151	217	.....	.....	9	46	105	5	20	48,150	48,241
New York	14,777	2,025	831	423	132	50	20	67	187	3	15	53,458	53,398
Philadelphia	15,851	1,307	771	260	70	29	8	41	150	2	10	56,310	57,302
Pittsburg	11,784	.....	708	149	.....	.....	6	21	90	1	3	43,195	43,602
San Francisco	7,476	302	1,539	234	96	21	4	436	721	939	629	44,130	43,378
Topeka	23,671	.....	1,864	294	.....	.....	18	356	906	122	175	108,879	109,579
Washington	9,932	1,437	1,544	529	169	109	65	136	425	25	43	52,864	53,197
Total	203,236	8,545	21,264	4,845	703	283	395	2,459	6,633	1,744	2,881	946,194	951,687

EXHIBIT 6.—*Number of pensioners in each State and Territory, each insular possession, and each foreign country on the roll June 30, 1909, and the amounts paid therein during the fiscal year 1909.*

State or country.	Number.	Amount.
UNITED STATES.		
Alabama	3,783	$612,351.82
Alaska	90	14,378.21
Arizona	865	148,871.28
Arkansas	10,621	1,769,369.25
California	28,314	4,618,506.30
Colorado	9,201	1,356,321.12
Connecticut	11,774	1,877,593.51
Delaware	2,679	458,606.37
District of Columbia	8,660	1,499,295.17
Florida	3,813	629,510.33
Georgia	3,492	561,077.12
Idaho	2,293	392,709.47
Illinois	66,402	11,310,829.63
Indiana	57,042	10,639,725.45
Iowa	33,558	5,753,679.86
Kansas	37,387	6,923,773.81
Kentucky	25,163	4,319,134.34
Louisiana	6,394	951,102.86
Maine	17,273	3,113,525.52
Maryland	12,617	2,164,269.99
Massachusetts	40,098	6,629,747.21
Michigan	39,793	7,072,698.63
Minnesota	15,438	2,652,045.48
Mississippi	4,709	760,604.19
Missouri	48,413	8,743,756.53
Montana	2,255	366,632.71
Nebraska	15,578	2,650,461.22
Nevada	458	72,861.67
New Hampshire	7,655	1,366,183.34
New Jersey	21,572	3,484,507.05
New Mexico	2,257	351,629.76
New York	83,394	13,942,140.61
North Carolina	4,062	668,913.66
North Dakota	2,251	403,037.00
Ohio	92,507	16,376,313.45
Oklahoma	13,639	1,851,374.28
Oregon	7,881	1,280,731.60
Pennsylvania	92,066	15,353,874.43
Rhode Island	5,329	837,540.75
South Carolina	1,996	295,031.60
South Dakota	5,333	946,188.44
Tennessee	18,645	3,165,214.29
Texas	8,972	1,370,479.54
Utah	1,053	175,231.90
Vermont	7,693	1,470,119.47
Virginia	8,738	1,507,758.79
Washington	11,017	1,780,413.57
West Virginia	12,056	2,077,806.50
Wisconsin	23,739	4,065,105.08
Wyoming	982	160,009.95
Total	941,000	160,993,044.11
INSULAR POSSESSIONS.		
Hawaii	74	11,913.33
Philippines	41	9,967.20
Porto Rico	32	5,066.83
Total	147	26,947.36
FOREIGN COUNTRIES.		
Algeria	1	144.00
Argentina	12	2,050.57
Australia	72	$12,360.37
Austria-Hungary	33	5,670.80
Azores	5	840.13
Bahamas	4	672.20
Belgium	18	3,085.33
Bermuda	8	1,365.03
Bolivia	1	180.27
Brazil	4	576.00
Canada	2,631	451,540.53
Cape de Verde Islands	1	96.00
Chile	10	1,692.30
China	17	2,908.70
Comora Islands	1	90.00
Costa Rica	5	850.17
Cuba	54	9,273.03
Danish West Indies	4	645.30
Denmark	35	6,000.05
Dominican Republic	1	180.00
Dutch West Indies	3	360.00
England	371	63,685.73
Egypt	2	324.00
France	57	9,782.90
Germany	580	99,540.40
Greece	8	1,370.04
Guatemala	3	492.80
Haiti	1	180.00
Honduras	2	277.70
Hongkong	3	336.40
India	7	1,200.37
Ireland	460	78,951.80
Isle of Man	2	144.00
Isle of Pines	6	920.00
Italy	42	7,208.47
Jamaica	7	1,196.00
Japan	20	3,430.60
Korea	1	144.00
Liberia	10	1,700.30
Madeira	6	1,176.00
Malta	2	288.00
Mexico	160	27,461.70
Netherlands	11	1,800.93
Newfoundland	4	576.00
New Zealand	10	1,708.40
Nicaragua	4	480.00
Norway	57	9,780.90
Panama	12	2,047.40
Paraguay	1	240.00
Peru	10	1,712.80
Portugal	3	284.00
Russia	14	2,400.80
Samoa	1	144.00
Scotland	91	14,920.33
Seychelles Islands	1	108.00
South Africa	6	1,029.80
Spain	1	144.00
St. Helena	1	144.00
St. Martin	1	108.00
Sweden	55	9,440.60
Switzerland	61	10,470.40
Turkey	11	1,790.63
Uruguay	3	624.00
Wales	19	3,260.90
Total	5,047	863,607.88

SUMMARY.

	Pensioners.	Payments.
Pensioners residing in States and Territories and payments to them	941,000	$160,993,044.11
Pensioners residing in insular possessions and payments to them	147	26,947.36
Pensioners residing in foreign countries and payments to them	5,047	863,607.88
Total	946,194	161,883,599.35
Payments by Treasury Department (Treasury settlements)		90,104.42
Total payments on account of army and navy pensions for the fiscal year		161,973,703.77

EXHIBIT 7.—*Statement showing, by classes, the different monthly rates paid to pensioners and number at each rate on roll June 30, 1909.*

Rate.	Regular establishment.		Civil war.							War with Spain.		War of 1812.	War with Mexico.		Indian wars.	
			Act Feb. 6, 1907.	General law.			Act June 27, 1890.		Act Apr. 19, 1908.							
	Invalids.	Widows, etc.		Invalids.	Nurses.	Widows, etc.	Invalids.	Minors, etc.	Widows.	Invalids.	Widows, etc.	Widows.	Survivors.	Widows.	Survivors.	Widows.
$1.50	1															
2.00	5															
3.00	2															
4.00	3															
5.00	9															
6.00	3,463			1,928			5,896			10,073						
6.25										6						
7.00				3												
7.50	18			16			1			36						
8.00	1,827			1,567		8	10,345	49		3,875					1,529	
8.50	1			20						37						
9.00				9												
9.50	2			2												
9.75	1															
10.00	1,219			1,322			6,817			2,304						
10.50	3															
11.00	3			4												
11.25				29						22						
11.33⅓				1												
11.50	3			1												
11.75				3												
12.00	1,450	2,808	209,427	16,077	363	68,628	81,503	4,284	211,781	1,989	4,724	374	59	6,331		2,779
12.25				8												
12.50	8			16						9						
12.75	2			76						47						
13.00	4			79												
13.25				6												
13.37½				1												
13.50	1		1	5						1						
13.68	1															
13.75	1			2												
14.00	536		3	12,231		1				639						
14.25				3												
14.50	1															
14.75				2												
15.00	37	53	90,589	942		1,330	2			81	31		6			
15.25				3												
15.50	1			4						1						
15.54	1															
15.68	1															
15.75				1						1						
15.86	1															
16.00	135			3,441						36						
16.25				1												
16.50	2			9												
16.68	1															
16.75				3												
17.00	1,305	110		30,030		2,046				1,219	68					
17.25	1			1												
17.50	9			6												
17.75				1												
17.86	1															
18.00	19		1	289												
18.18	1															
18.25	1															
18.50	3			7												
18.75			1	26						8						
19.00	2			4												
19.18	2															
19.25	1			2												
19.50	1															
19.68	1															
19.75							1									
20.00	67	177	58,246	2,528		1,953	2			89	70		2,067			
20.36	1															
20.50	6															
20.68	3															
21.00	3		1	2												

EXHIBIT 7.—*Statement showing, by classes, the different monthly rates paid to pensioners and number at each rate on roll June 30, 1909*—Continued.

Rate.	Regular establishment.		Act Feb. 6, 1907.	Civil war.						War with Spain.		War of 1812.	War with Mexico.		Indian wars.	
				General law.			Act June 27, 1890.		Act Apr. 19, 1908.							
	Invalids.	Widows, etc.		Invalids.	Nurses.	Widows, etc.	Invalids.	Minors, etc.	Widows.	Invalids.	Widows, etc.	Widows.	Survivors.	Widows.	Survivors.	Widows.
$21.18										1						
21.25	11			3						1						
21.36	1															
21.50	1		1	1												
22.00	48			1,716						35						
22.50	4		2	30				2		3						
22.68	2															
23.00	3		5													
23.18	1															
23.25				2												
23.50	2															
23.86	2															
24.00	798			24,770				5		449						
24.18	1															
24.36	1															
24.50			1	2												
24.59½	1															
25.00	74	129	4	1,548		463				27	37		1			
25.25				1												
25.50			1													
25.69½	1															
25.75	1															
26.00	2		1							2						
26.36	3															
26.50	1															
26.68	1															
26.75	1			1												
27.00	29		3	776				2		14						
27.18	2															
27.36	1															
27.50	5		1	2						2						
27.68										1						
27.86	1															
28.00	1		1													
28.50	1															
28.68	1															
29.00	1									1						
29.18	2									1						
29.36	3															
29.50			1													
29.68	1															
30.00	587	208	1	12,348		398				395	24					
30.50	1		1													
30.68	1															
31.00	1		1													
31.18	1															
31.25	1		1	9												
32.00	2		2													
32.18	1															
32.36	1															
32.50	2		3													
32.68	1															
33.00	1		1													
33.36	1															
33.50	1															
34.00	1		2	1												
34.18	2															
34.25										1						
34.50	4							1								
34.86	2															
35.00			1													
35.50	2		1													
35.68	4															
36.00	6		2	48						4						
36.18	2									1						
36.50	1															
37.00	1		1													
37.18										1						

EXHIBIT 7.—*Statement showing, by classes, the different monthly rates paid to pensioners and number at each rate on roll June 30, 1909*—Continued.

Rate.	Regular establishment.		Civil war.							War with Spain.		War of 1812.	War with Mexico.		Indian wars.	
			Act Feb. 6, 1907.	General law.			Act June 27, 1890.		Act Apr. 19, 1908.							
	Invalids.	Widows, etc.		Invalids.	Nurses.	Widows, etc.	Invalids.	Minors, etc.	Widows.	Invalids.	Widows, etc.	Widows.	Survivors.	Widows.	Survivors.	Widows.
$37.19½	1															
37.36	1															
37.50	2		1													
37.68	2															
37.86	1															
38.00	1															
38.36	1															
39.00			1													
39.04	1															
40.00	142			2,638			1			94						
40.24½	1															
40.50	1															
40.68	1															
41.00	2															
41.68										1						
41.86	1															
42.00	2		1													
42.36	1															
42.50	1		1													
42.68										1						
43.00	1															
43.50	1		1				1									
44.00	1															
44.50	1															
45.00			2	10			1			1						
45.50	1															
46.00	72		1	1,425						56						
46.18	1															
47.00	3						1									
47.25	1															
48.00				1												
48.50	1															
48.74½	1															
48.78	1															
48.86										1						
49.50	1															
50.00	67			1,134		1				62						
50.36										1						
52.00	7															
52.68	1															
55.00	33			1,594						30						
55.36	1															
57.50	1															
58.00	3															
59.00	1			1												
60.00	1			2												
61.18	1															
62.36	1															
62.86	1															
63.00	1															
72.00	70			701						41						
75.00				3												
82.50	1															
88.00	1															
100.00	28			535						13						
100.18	1															
108.00	1									1						

EXHIBIT 8.—*Statement showing, by classes, the different monthly rates paid to pensioners under special acts of Congress and number at each rate on roll June 30, 1909.*

Rate.	Regular establishment.		Civil war.			War with Spain.		War of 1812, widows.	War with Mexico.		Indian wars.	
	Invalids.	Widows.	Invalids.	Nurses.	Widows.	Invalids.	Widows.		Survivors.	Widows.	Survivors.	Widows.
$6.00	5		7			9	1					
8.00	11		34		16	27	1		3	1	23	
10.00	7		10		3	15						
12.00	46	75	381	99	1,771	84	80	3	23	273	4	100
12.50						1						
12.75						1						
14.00	2		27		3	2						
15.00	1	3	20		89	4	1		1	1	1	
16.00	3		34		225	3		1	1	14	185	
17.00	9	5	120		140	12	2					
17.50			1									
18.00		3	14		49	2	1	1		1		
18.75						1						
20.00	9	26	512	6	486	14	14	3	272	4	2	1
22.00		1	9			1						
24.00	15		4,851	2	116	19	1	12	2			1
25.00	1	30	36	8	117		25	1	1	1		
27.00			1									
28.00	1											
30.00	16	68	3,975		180	39	17		23	6		
32.00					1							
33.00			1									
35.00		25	1		10		6					
36.00	3		312		2							
40.00	4	59	358		18	2	10			1		
42.00					1							
45.00	1	1	31		1							
46.00	4		15			2						
49.00			1									
50.00	10	81	208		66	12	14					
55.00			21			1						
60.00	1		17									
65.00			3									
67.00			1									
70.00			1									
72.00	2		28			1						
75.00		2	1		5		1					
100.00	1	4	21		8	1						
125.00		1										
166.66⅔					2							
208.33⅓		1										
416.66⅔					1							
Total	152	385	11,052	115	3,310	253	174	21	326	302	215	102

EXHIBIT 9.—*Report of certificates issued during the fiscal year ended June 30, 1909.*

Classes.	Original.	Increase.	Additional.	Reissue.	Restoration.	Renewal.	Supplemental.	Total.
General law:								
Army—								
Invalids	24	8,138	.....	149	25	1,070	52	9,458
Nurses	7	1	.....	.....	.....	.....	.....	8
Widows, etc	1,317	92	.....	60	33	605	14	2,121
Navy—								
Invalids	.....	41	.....	1	.....	8	.....	50
Widows, etc	9	.....	.....	3	.....	5	1	18
War of 1812—widows	1	3	.....	.....	.....	.....	.....	4
Old wars—widows, etc	2	.....	.....	.....	1	4	.....	7
War with Spain—								
Army—								
Invalids	1,754	1,219	.....	90	28	48	.....	3,139
Widows, etc	243	1	.....	4	.....	4	1	253
Navy—								
Invalids	33	32	.....	1	.....	.....	.....	66
Widows, etc	17	.....	.....	.....	.....	.....	.....	17
Regular establishment—								
Army—								
Invalids	794	605	.....	35	3	3	.....	1,440
Widows, etc	229	11	.....	2	.....	2	3	247
Navy—								
Invalids	374	125	.....	20	7	19	.....	545
Widows, etc	111	11	.....	5	.....	.....	.....	127
Act of June 27, 1890:								
Army—								
Invalids	894	2,557	127	51	16	26	157	3,828
Widows, etc	6,361	168	.....	36	22	19	306	6,912
Navy—								
Invalids	108	109	1	6	1	3	8	236
Widows, etc	212	3	.....	3	.....	1	12	231
Act of February 6, 1907:								
Army—civil war	4,710	24,624	.....	35,144	5	114	11	64,608
Navy—civil war	390	1,023	.....	1,154	.....	2	.....	2,569
Mexican war	1	3	.....	38	.....	.....	.....	42
Act of April 19, 1908:								
Army widows	26,215	31	.....	29	5	133	2	26,415
Navy widows	710	1	.....	1	.....	7	.....	719
War with Mexico, act 1887, etc.:								
Survivors	3	2	.....	3	.....	.....	1	9
Widows	272	14	.....	.....	1	.....	.....	287
Indian wars:								
Survivors	139	77	.....	.....	.....	.....	.....	216
Widows	158	11	.....	.....	.....	1	.....	170
Total	45,088	38,902	128	36,835	147	2,074	568	123,742

Certificates issued each month during fiscal year.

July, 1908	11,205	February, 1909	9,230
August, 1908	9,763	March, 1909	8,579
September, 1908	9,186	April, 1909	12,353
October, 1908	14,482	May, 1909	9,241
November, 1908	10,663	June, 1909	8,484
December, 1908	10,371		
January, 1909	10,185	Total	123,742

EXHIBIT 10.—*Classification of claims pending June 30, 1909.*

Civil war:			
General law—			
Original invalid	533		
Reissue invalid	766		
Increase invalid	12,909		
		14,208	
Original widows	2,106		
Reissue widows	475		
Increase widows	27		
		2,608	
Original minors	584		
Reissue minors	23		
Increase minors	93		
		700	
Original dependents		99	
Army nurses		17	
			17,632
Act of June 27, 1890—			
Original invalid	1,545		
Additional invalid	179		
Increase invalid	1,483		
		3,207	
Original widows	5,422		
Supplemental widows	67		
Original minors	1,340		
		6,829	
			10,036
Act of March 3, 1901—			
Remarried widows			878
Act of February 6, 1907—			
Original		2,789	
Reissue		3,305	
Increase		2,822	
			8,916
Act of April 19, 1908—			
Original widows			8,913
			46,375
Regular establishment—			
Original invalid		3,080	
Increase invalid		532	
			3,612
Original widows		230	
Original minors		27	
Original dependents		151	
			408
			4,020
War with Spain:			
Original invalid		13,199	
Increase invalid		1,315	
			14,514
Original widows		533	
Original minors		50	
Original dependents		316	
			899
			15,413
Mexican war:			
Survivors (act Jan. 29, 1887)		7	
Survivors (act Feb. 6, 1907)		13	
Increase (act Jan. 5, 1893)		1	
			21
Widows (act Jan. 29, 1887)			189
			210
Indian wars (acts of July 27, 1892, June 27, 1902, and May 30, 1908):			
Survivors			36
Widows			154
			190

Old wars:			
Original invalid	5		
Increase invalid	8		
		13	
Original widows	4		
Renewal widows (act Mar. 3, 1901)	1		
		5	
			18
Total			66,226

Agencies, dates of payment, and districts.

AUGUSTA, ME.

Quarterly payments March 4, June 4, September 4, and December 4.
District.—The State of Maine. Navy pensioners in this district are paid at Boston, Mass.

BOSTON, MASS.

Quarterly payments March 4, June 4, September 4, and December 4.
District.—The States of Connecticut, Massachusetts, and Rhode Island, and all navy pensioners residing in this and the Augusta and Concord districts.

BUFFALO, N. Y.

Quarterly payments January 4, April 4, July 4, and October 4.
District.—The counties in the State of New York not in the New York City district. All navy pensioners in the State are paid at New York City.

CHICAGO, ILL.

Quarterly payments January 4, April 4, July 4, and October 4.
District.—The State of Illinois, and all navy pensioners residing in this and the Columbus, Des Moines, Detroit, Indianapolis, Louisville, Milwaukee, and Topeka districts.

COLUMBUS, OHIO.

Quarterly payments March 4, June 4, September 4, and December 4.
District.—The State of Ohio. Navy pensioners in this district are paid at Chicago.

CONCORD, N. H.

Quarterly payments January 4, April 4, July 4, and October 4.
District.—The States of New Hampshire and Vermont. Navy pensioners in this district are paid at Boston.

DES MOINES, IOWA.

Quarterly payments January 4, April 4, July 4, and October 4.
District.—The States of Iowa and Nebraska. Navy pensioners in this district are paid at Chicago.

DETROIT, MICH.

Quarterly payments March 4, June 4, September 4, and December 4.
District.—The State of Michigan. Navy pensioners in this district are paid at Chicago.

INDIANAPOLIS, IND.

Quarterly payments February 4, May 4, August 4, and November 4.
District.—The State of Indiana. Navy pensioners in this district are paid at Chicago.

KNOXVILLE, TENN.

Quarterly payments February 4, May 4, August 4, and November 4.
District.—The States of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas. Navy pensioners in this district are paid at Washington, D. C.

LOUISVILLE, KY.

Quarterly payments February 4, May 4, August 4, and November 4.
District.—The State of Kentucky. Navy pensioners in this district are paid at Chicago.

MILWAUKEE, WIS.

Quarterly payments January 4, April 4, July 4, and October 4.
District.—The States of Minnesota, North Dakota, South Dakota, and Wisconsin. Navy pensioners in this district are paid at Chicago.

NEW YORK CITY, N. Y.

Quarterly payments February 4, May 4, August 4, and November 4.
District.—The following counties in the State of New York: Albany, Clinton, Columbia, Delaware, Dutchess, Essex, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Suffolk, Sullivan, Ulster, Warren, Washington, and Westchester. The following counties in the State of New Jersey: Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, and Warren; all navy pensioners in the State of New York, and all pensioners residing in the island of Porto Rico.

PHILADELPHIA, PA.

Quarterly payments February 4, May 4, August 4, and November 4.
District.—The following counties in the State of Pennsylvania: Berks, Bradford Bucks, Carbon, Chester, Columbia, Dauphin, Delaware, Lackawanna, Lancaster, Lebanon, Lehigh, Luzerne, Monroe, Montgomery, Montour, Northampton, Northumberland, Philadelphia, Pike, Schuylkill, Sullivan, Susquehanna, Wayne, Wyoming, and York. The following counties in the State of New Jersey: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem, and all navy pensioners in the State of Pennsylvania.

PITTSBURG, PA.

Quarterly payments January 4, April 4, July 4, and October 4.
District.—The counties in the State of Pennsylvania not in the Philadelphia district. All navy pensioners in the State are paid at Philadelphia.

SAN FRANCISCO, CAL.

Quarterly payments March 4, June 4, September 4, and December 4.
District.—The States of California, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming; the Territories of Alaska, Arizona, and Hawaii; the Philippines, Guam, and the Samoan Islands belonging to the United States; including all navy pensioners.

TOPEKA, KANS.

Quarterly payments February 4, May 4, August 4, and November 4.
District.—The States of Colorado, Kansas, Missouri and Oklahoma, and the Territory of New Mexico. Navy pensioners in this district are paid at Chicago.

WASHINGTON, D. C.

Quarterly payments March 4, June 4, September 4, and December 4.
District.—The States of Delaware, Maryland, Virginia, and West Virginia; the District of Columbia; all pensioners residing in foreign countries, and all navy pensioners residing in this and the Knoxville districts.

REPORT OF THE COMMISSIONER OF PATENTS.

REPORT OF THE COMMISSIONER OF PATENTS.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
Washington, D. C., September 6, 1909.

SIR: I have the honor to submit herewith the following report of the business of the United States Patent Office for the fiscal year ended June 30, 1909:

Applications and caveats received during fiscal year ended June 30, 1909.

Applications for patents for inventions	62,800
Applications for patents for designs	1,186
Applications for reissues of patents	192
Applications for registration of trade-marks	7,509
Applications for registration of labels	1,001
Applications for registration of prints	338
Total applications	73,026
Caveats	2,052
Disclaimers	11
Appeals on the merits	1,345
Total applications, caveats, disclaimers and appeals	76,434

Applications awaiting action.

Applications awaiting action on the part of the office, July 1, 1909	17,153

Applications for patents, including reissues, designs, trade-marks, labels, and prints.

June 30, 1900	45,270	June 30, 1905	66,228
1901	48,075	1906	68,881
1902	51,258	1907	66,795
1903	54,256	1908	68,441
1904	55,468	1909	73,026

Applications awaiting action on the part of the office.

June 30, 1900	3,564	June 30, 1905	16,077
1901	7,683	1906	21,958
1902	11,042	1907	13,634
1903	9,842	1908	20,043
1904	13,069	1909	17,153

Patents withheld and patents expired.

Letters patent withheld for nonpayment of final fees	6,763
Letters patent expired	22,779
Applications allowed, awaiting payment of final fees	13,299

Patents granted and trade-marks, labels, and prints registered.

Class.	1905.	1906.	1907.	1908.	1909.
Letters patent	29,680	31,070	33,644	34,003	34,332
Design patents	458	633	529	748	721
Reissue patents	128	134	165	151	162
Trade-marks	1,426	10,408	8,798	6,135	4,547
Labels	1,028	741	660	636	779
Prints	345	354	325	279	231
Total	33,065	43,340	44,121	41,952	40,772

Expenditures.

	Expended.	Estimated liabilities.	Total.
Salaries	$1,182,289.98		$1,182,289.98
Scientific library	709.81		709.81
Postage on foreign matter	1,235.00		1,235.00
Stationery	12,341.96		12,341.96
Ice	671.09		671.09
Telephones	753.44		753.44
Washing towels	128.76		128.76
Furniture, carpets, linoleum, matting, and sundries	16,629.00		16,629.00
Law library	483.90		483.90
Public use	100.50		100.50
Photolithographing, paid contractor	131,854.44		131,854.44
Photographic printing, paid contractor	8,145.56		8,145.56
Official Gazette and indexes, paid Public Printer	179,168.53		179,168.53
Printing and binding:			
Printing specifications	325,234.37		325,234.37
Miscellaneous printing and binding	26,947.01		26,947.01
International Convention for Protection of Industrial Property		$750.00	750.00
Total	1,886,693.35	750.00	1,887,443.35

Receipts and expenditures.

Receipts from all sources	$1,975,919.97
Expenditures (including total in all appropriations)	1,887,443.35
Surplus	88,476.62

Comparative statement of receipts and expenditures, 1900 to 1909.

June 30—	Receipts.	Expenditures.
1900	$1,358,228.35	$1,247,827.58
1901	1,408,877.67	1,288,970.13
1902	1,491,538.85	1,329,924.63
1903	1,591,251.04	1,423,094.40
1904	1,663,879.99	1,469,124.40
1905	1,737,334.44	1,472,467.51
1906	1,811,297.84	1,538,149.40
1907	1,859,592.89	1,584,489.70
1908	1,874,180.75	1,608,292.01
1909	1,975,919.97	1,887,443.35

As specified in the foregoing statement, there were received in the last fiscal year 62,800 applications for mechanical patents, 1,186 applications for designs, 192 applications for reissues, 2,052 caveats, 7,509 applications for trade-marks, 1,001 applications for labels, and 338 applications for prints. There were 35,215 patents granted, including reissues and designs, and 4,547 trade-marks, 779 labels,

and 231 prints were registered. The number of patents that expired was 22,779. The number of allowed applications, which were by operation of law forfeited for nonpayment of the final fees, was 6,763.

It will be observed that the usual annual increase in the volume of business has resulted. The applications for patents for inventions have increased over last year by between 4,000 and 5,000 cases. The applications for trade-marks, however, show an increase of only 42. The number of trade-marks registered shows a decrease of 1,598.

The "act to amend and consolidate the acts respecting copyrights," which was approved March 4, 1909, and which became effective July 1, 1909, repealed the act approved June 18, 1874, under section 3 of which labels and prints have been registered in the Patent Office. Consequently no certificates of registration of labels or prints have been issued since July 1, 1909, except those evidencing registrations effected on or before June 30, 1909.

The money receipts from all sources were $1,975,919.97, and the expenditures $1,887,443.35, leaving a net surplus of receipts over expenditures of $88,476.62. The grand total of receipts over expenditures for maintaining the bureau from 1836 to date is now $7,060,547. This vast sum represents the earnings of the Patent Office, and the bureau is therefore more than self-supporting.

CONDITION OF WORK.

I take great pleasure in reporting that by reason of the increase in salaries of the examining corps, which became effective July 1, 1908, comparatively few resignations have taken place within the last year. By reason of the retention of the skilled examiners and of the additional force which was made available July 1, 1908, it has been possible to bring up the work of the Patent Office, so that it is now practically current in nearly all of the examining divisions of the office. It is my purpose to keep the work current in all branches of the office, if possible.

The employees of this office have been most loyal in their efforts, not only to bring up the work, but to keep it current. In many instances examiners have worked overtime, and in a few cases they have deferred taking their annual leave in order that the work might not be retarded by reason of their temporary absence. It is, however, taxing the examining force to its utmost to maintain the work in its present condition. The rapid increase in the number of applications filed and the constantly increasing field of search, embracing as it does not only United States and foreign patents, but also publications of every character, make it imperative that additional force be provided each year to prevent accumulation of the work.

The classification of patents is progressing as rapidly as could be expected with the force available for that purpose. There are now

over 930,000 United States patents, approximately half of which have been reclassified, and over 2,000,000 foreign patents, aside from the subject-matter embraced in nearly 90,000 volumes of the scientific library, which remain to be classified and digested. When this work is accomplished the labor and expense of examination will be lessened by nearly one-third, and the validity of the patents issued thereafter will be better insured. It is impossible, because of the lack of room, as well as of the lack of force, to detail as many examiners for this work as would be desirable, but it is believed that a small additional force should be provided for this purpose. For the reasons above stated, I have asked for one new principal examiner and twenty additional assistant examiners.

MODELS.

The models which have been stored in the basement and on the first floor of the Patent Office building during the last year have been removed to a fireproof warehouse at Nos. 418 and 420 Tenth street NW., where they are securely housed without expense other than the rental of storage space, which is at the rate of $3,000 per annum.

ADDITIONAL ROOM.

The additional rooms which were assigned to this office by yourself and your predecessor, to the inconvenience of your own force, have resulted in a vast improvement in the working condition of this office. There is now, however, insufficient room for the present needs of the office, and within the next year crowded conditions will recur. It is therefore essential that additional space be provided in the very near future.

The scientific library is at the present time in a very crowded condition. More shelving space and additional steel stacks are now required to accommodate the books in possession of the library, and still further space will be required for the volumes which are being constantly purchased out of the annual appropriation, as well as additional shelving for the foreign patents, which are increasing at a rapid rate each year. For example, Austria publishes about 32 volumes per annum, France 50, Germany 150, and Great Britain about the same number. It is estimated that provision should now be made for steel stacks at the rate of at least 150 linear feet per annum. In order to provide for the present conditions and for the increase in the next five years, I recommend that Congress be asked to appropriate $2,000, or so much thereof as may be necessary for this purpose.

The facilities of the attorneys' room and the public search room are inadequate, and within the year the available space for classified copies of United States patents will have been quite exhausted.

I would direct your attention, in the interest of the necessary yearly extension of this growing office, to the plans for the remodeling of the building made by the Supervising Architect of the Treasury Department, and also the Superintendent of the Capitol Buildings and Grounds, which provide for the remodeling of the basement upon the other three sides of the building to harmonize with the Ninth street front. These plans, if carried out, would result in temporary relief to this bureau for two or three years. However, with such changes, the rapid growth of the Patent Office, which keeps pace with the growth of the country and the trade and commercial activities of the nation, will soon develop beyond any possible relief which can be given by the remodeling of the present Patent Office building. The construction of a new building will therefore soon be imperative.

NEW BUILDING.

The Patent Office has been more than self-supporting since its creation. Each year there has been a large surplus after deducting the salaries and every item of expense charged to this bureau. The net surplus up to the present time is $7,060,547. This sum represents the net earnings of the Patent Office, and it is due to the inventors of this country that this money should be utilized for the purpose of providing suitable facilities for expediting the work of the Patent Office. To accomplish this a sufficient amount of that sum should be appropriated to provide a new building, in which ample room will be afforded to properly and promptly transact the business of the office. It is necessary that patents for new inventions should be issued with the utmost promptness after the application for patent has been filed, for such inventions form the basis of vast industries, which inure not merely to the profit of the inventor, but to the benefit of the manufacturer, the laborer, the trader, the professional man, and the consumer, and to the commercial interests of the country in general. Great Britain and Germany have each recognized the necessity of providing ample facilities for the work of their patent bureaus, and have each recently erected new buildings for their patent offices, which are in every way more commodious and better adapted for the business of a patent office than the building which now houses the United States Patent Office, although the patent business of each of those countries is small when compared with that transacted in the United States Patent Office.

In this connection, if I may be permitted, I would direct your attention to the bill (S. 3954) introduced by Senator Daniel on January 24, 1908, and would recommend that Congress be urged to pass this bill, which provides for a companion building to the Library of Congress, located upon the square immediately north thereof.

The cost of this building and ground would not exceed the net surplus of receipts of the United States Patent Office over expenditures. This site would be accessible to all persons arriving at the Union Station and is easily reached from any part of the city. It is also desirable for the reason that the location would be comparatively free from noise, for it is quite essential for persons doing work of the character comprised in the examination of applications for patent, literary work, etc., that the building should be away from disturbing noises. The location, as well as the structure of the building provided for in the Daniel bill, meets my full approval, and I most earnestly recommend that Congress be urged to make a sufficient appropriation at once for the purchase of that property and for the erection of the building.

LEGISLATION.

In the appropriation bill for the fiscal year beginning July 1, 1909, appropriation was made for the additional office of First Assistant Commissioner of Patents. This officer has greatly assisted me in handling the vast amount of appellate judicial work, as well as in the executive work of directing the affairs of the Patent Office.

I desire to repeat the recommendation made in my report to the Secretary, dated June 30, 1907, and referred to in my report to Congress of December 31, 1908, in reference to the elimination of one of the appeals in this office.

Under the present patent law, appeal lies in *ex parte* cases from a primary examiner to the board of examiners in chief, thence to the commissioner (the first assistant commissioner, or the assistant commissioner), and from his decision to the Court of Appeals of the District of Columbia, and in interference cases the course of appeals from decisions of the examiner of interferences is the same, there being three appeals in each case.

The purpose of the proposed amendment to the statute is to shorten the course of prosecution by the elimination of one of the appeals within the office. This is designed to be accomplished by combining the commissioner, first assistant commissioner, assistant commissioner, and examiners in chief into a single appellate tribunal, any three of whom shall constitute a quorum, to which all appeals shall lie, whether from a primary examiner or from the examiner of interferences, and from which appeals would lie to the Court of Appeals of the District of Columbia.

The present course of appeals is not well adapted to the volume of business which the office is now called upon to handle for the following reasons:

1. It imposes on applicants an unnecessary amount of delay and expense. The very purpose of the patent system is to place at the

service of the public at as early a date as practicable inventions as they are made, and unnecessary delays affect not only applicants but all interested in the industries to which the inventions relate. One appeal within the office, together with the appeal to the Court of Appeals of the District of Columbia, would seem to be ample, especially in view of the fact that in a suit on a patent a single appeal takes the case from the trial court to the court of appeals. The elimination of one appeal would materially shorten the time required for the ultimate disposal of appealed cases, and effect a considerable saving of expense to applicants.

2. Section 4910 provides for an appeal to the commissioner *in person* from the board of examiners in chief. The work of the office and the consequent number of appeals have increased to such an extent that it has become difficult, and will soon be impossible, for the commissioner to give to each case the amount of personal attention proper to its disposal.

3. The board of examiners in chief as at present constituted consists of three members, and no provision is made under the present law to supply a temporary vacancy caused by the sickness or absence from other cause of any of the members. The absence of one member often results in an evenly divided board, with the consequent necessity for a rehearing, and the absence of two members causes an entire suspension of business. With the proposed appellate board, the presence of a quorum of three would be practically assured at all times, which has not been the case in numerous instances in the past, owing to frequent absences of a member of the board on account of periods of illness of greater or less duration and also by reason of annual leave and other causes. The work of this tribunal has so greatly increased during the last few years that it is almost impossible for its members to give the thorough joint consideration to each case which it deserves.

The existing trade-mark law provides for appeals from the examiner of trade-marks and from the examiner of interferences in trade-mark cases directly to the commissioner (first assistant, or assistant commissioner). From these tribunals appeals lie to the Court of Appeals of the District of Columbia, as in patent cases. The amendment submitted merely substitutes the proposed board of appeals for the commissioner as the appellate tribunal of the office in cases relating to trade-marks, making the course of appeals in this class of cases conform to the course of appeals recommended above in cases involving applications for patents.

These changes in the course of appeals would not only have the effect of expediting the prosecution of applications on appeal, but the elimination of an appeal would be a saving to the inventors of one appeal fee, the attorneys' fees, and other expenses incident

thereto. Futhermore, having but one appeal within the office in lieu of two would result in giving greater stability to the decisions of the office tribunals, and would also obviate any want of comity that has at times existed in the past between the decisions of the commissioner of patents and the assistant commissioner. These proposed changes in the law in no wise affect the present legal status of the Commissioner of Patents, the first assistant commissioner, the assistant commissioner, or the examiners in chief.

Bills S. 3970 and 3973, embracing the substance of this recommendation, were introduced by Senator Smoot and were passed by the Senate. No action, however, was taken upon these bills in the House. I most earnestly recommend that the attention of Congress be again directed to this matter and that the passage of such bills be urged, in view of the following facts:

1. It is the practically unanimous opinion of inventors and manufacturers throughout the country that one appeal should be eliminated in the Patent Office in order to save the great cost and loss of time now involved in obtaining a final adjudication and consequent grant of patent.

2. The fact that no general protest has been lodged and no effective arguments have been made against the passage of the bill.

3. Scientific journals have favorably commented upon this measure by editorials and otherwise and offered no protest or objection.

4. The great saving of time and labor to the tribunals of the Patent Office. Under the present system the work is done twice to no good effect.

5. This is an important part of the plan to expedite business and to grant patents to inventors within a reasonable time, which they have demanded and to which they are entitled.

I also desire to recommend the passage of certain bills which were introduced in the Senate during the last regular session of Congress (S. 8610, 8611, and 8612). In my report to Congress, dated December 31, 1908, I pointed out the importance and necessity for these proposed amendments to the patent laws. The most important (S. 8610) deals with the safeguarding of applications from possible mutilation or fraudulent amendment during their pendency in the Patent Office, and with increasing the certainty of examinations of applications. The others (S. 8611 and 8612) comprise merely verbal changes in sections 4917 and 4893 of the Revised Statutes, in the interest of accuracy and clearness.

Senate bill 8610 provides for the amendment of section 4889 of the Revised Statutes. Certain changes in phraseology of the statute are provided by the bill; but the really essential provision is that there shall be required to be filed with an application for patent, in addition to the drawing, two photographic copies of such drawing. This

imposes upon every applicant for patent an additional statutory requirement, to wit, to file with each application of which a signed and attested drawing forms part, two photographic copies of such signed and attested drawing.

The purposes of this requirement are (1) to guard against and enable the detection of unauthorized changes in the original drawing, or abstraction of such drawing and substitution of another; (2) to lessen the danger of serious mistakes on the part of the office in failing to detect interferences between copending applications for the same invention.

It is proposed to accomplish the first purpose by causing to be filed in secret archives, in charge of the chief draftsman, one of these photographic copies, which may serve as a permanent standard of comparison with the pen-and-ink drawing from which the copies that form a part of the patent are taken. The drawing may be sent to the attorney's room upon request of anyone appearing of record as having an interest in the application, or it may be changed or abstracted and replaced by any corrupt employee of the Patent Office, leaving no evidence, or at best mere negative indications, that any unauthorized changes have been made. An illuminative example of what unauthorized changes may be made is found in the case of the Heany patent, No. 872936, where no drawing was filed originally with the application, but one was filed subsequently, which was later abstracted and replaced by another of entirely different character, the last drawing being the one which now forms a part of the patent. If at the time the Heany application was filed all applicants had been required to file a photographic reproduction of the drawing, the changes could hardly have been made without detection, except by the collusion of two or more persons, and with great difficulty.

It is proposed to accomplish the second purpose by retaining the second photographic copy of the drawing in the file wrapper and sending it with the file to the attorneys' room upon order, or to any other division or any tribunal of the Patent Office, when required, leaving the original drawing in the examining division, where the application is classified for examination; or, if for any reason it should become necessary to send the original drawing out of the examining division, the photographic copy could be retained therein, where it would be discovered in interference searches. Under the present procedure, both drawing and file wrapper are sent out of the division on attorneys' orders, also when they are placed in interference or are appealed; and the drawing is frequently sent out on orders of the official draftsman or the chief of the copy and manuscript division for extended periods, amounting, in interference proceedings, to years. While the drawing is out of the examining division interferences between the application of which it forms a

part and other subsequently filed applications may be overlooked, as the interference search is made by means of the drawing. The memory of the examiner can not always be relied upon to recall interfering applications, especially as the personnel of the force changes continually.

The size of the sheets upon which the proposed photographic copies shall be made, their character and disposition, may be left to the discretion of the Commissioner of Patents, who may prescribe, subject to the approval of the Secretary of the Interior, all proper requirements by rule under the authority of section 483 of the Revised Statutes.

It is very clear that it is desirable for applicants filing applications for patent to accompany the same with photographic copies of the drawings. This has been the opinion of my predecessors in office. Commissioner Butterworth issued an order to this effect, but subsequently revoked it because he was convinced that he could not legally enforce that order without statutory authority. The recent developments in the Patent Office in regard to the tampering with patent records make it essential that the statute be amended as requested, so as to give statutory authority to the requirement for the photographic copies. It may be said, however, that this is the first time that the records of the Patent Office have been tampered with during its history, covering a period of one hundred and nineteen years, and it is the only patent so tampered with in more than 900,000 patents, which have been granted by the United States to date.

The other two bills (S. 8611 and 8612) provide for slight amendments to sections 4917 and 4893, Revised Statutes, to which they apply, respectively. These amendments change only the word "claimant" in section 4893 to read *applicant,* and the word "claimant" in section 4917 to read *patentee.*

The word "claimant" is not, in my opinion, the proper word to use in these statutes. In all other statutes relating to patents the inventor is formally referred to as an "applicant" or as a "patentee." These two statutes are the only ones using the word "claimant." These amendments, therefore, will bring these statutes into conformity with the other statutes relating to patents.

The application for a patent is not a claim against the Government, and the attorney in a patent case is not prosecuting a claim against the Government. The patent, on the contrary, is in the nature of a contract and is so construed by the authorities on the subject and by the courts. The inventor having created something new, offers by his application to fully disclose his invention at once and to give it to the public at the end of seventeen years, provided the United States will allow him to have the exclusive possession thereof in the meantime. In granting a patent for an invention the Government is not

parting with anything possessed by the public prior to applicant's disclosure. If the inventor chooses not to disclose his invention, but to practice it in secret, the public is the loser. In payment for the invention the inventor obtains the right to bring suit in the federal courts against infringers during a period of seventeen years.

PATENT BAR.

I also desire to invite your attention to the necessity for legislation which would result in the establishment of a patent bar. It is suggested that a law be enacted providing that before an individual be permitted to practice before the United States Patent Office he shall be required to first pass an examination as to his moral, legal, and technical qualifications; that a committee shall be appointed by the Commissioner of Patents composed of officials of the Patent Office and patent attorneys of well-known standing in the profession who shall conduct the examination under the direction of the Commissioner of Patents, and the report of said committee shall be subject to his approval.

TREATIES.

I am gratified to report that during the last year a treaty was negotiated with Germany, which confers great benefits upon the American inventor. The patent laws of nearly all the foreign countries contain a clause providing that if an invention is not "worked"—that is, manufactured or practiced—in such country within a certain period, ranging from two to four years, the patent may be annulled. This treaty with Germany provides that the working of a patent in one of the contracting countries will have the same force and effect, so far as avoiding the revocation of the patent is concerned, as if it had been worked in the country in which the patent was granted. This treaty has practically assured to American inventors the protection of their rights in Germany during the full period for which the German patent is issued, contingent only on the working of the invention in one of the two countries.

It is understood that Sweden has modified its laws to extend similar protection to other countries which do not require the working of the invention within a specified period, and negotiations are now pending with nearly all the European States for the promulgation of treaties of the same character. In order to assist in the negotiations of these treaties, I have been delegated by the Department of State, and with your permission I shall visit the capitals of several foreign nations to assist, so far as is within my power, in the negotiations of such treaties, which if concluded will greatly extend the protection of inventors, manufacturers, and the industrial interests of this country, as well as those of the nations with whom such arrangements may be made.

THE INTERNATIONAL CONVENTION FOR THE PROTECTION OF INDUSTRIAL PROPERTY.

Congress at its last session appropriated the sum of $10,000 to defray the expenses of the meeting of the International Union for the Protection of Industrial Property, presumably to be held in May, 1910. Communication with the Director of the International Bureau at Berne, however, disclosed the fact that the period intervening between the date of such communication and May, 1910, was much too short for the required notices to the various governments, the preparation of programmes for the convention, etc., and it was suggested by the director that the earliest possible time at which such convention could be held would be October, 1910. However, it was recommended by him that the meeting of this convention be deferred until May, 1911, and I reported to the Secretary of State the advisability of such postponement.

The meeting of this convention is most important to the interests of the American inventors and manufacturers. The 21 nations which are adherents to this union will be represented by delegates having full power to negotiate agreements in respect to the reciprocal protection of patents, designs, trade-marks, and industrial models, which when ratified by their respective governments will have the force of treaties. The efforts of these conventions in the past have been crowned with success, the agreements relating to the reciprocal protection of patents and trade-marks having been ratified by all adherents, which comprise the leading commercial nations of the world, and the Congress of the United States has in each instance amended the patent laws of this country to accord with the terms of the international agreements concluded at these conventions.

Not only are the members of the union represented by delegates, but all other civilized nations, not members of the union, are invited to send representatives in the interest of furthering the reciprocal protection of industrial property. It is expected that at this coming convention a strong effort will be made to harmonize the laws relating to patents and trade-marks throughout all countries in such a manner that adequate protection will be given to an inventor, no matter of what country he may be a citizen, without the necessity of obtaining expensive patents in each of the several countries in which his invention may be used or sold. It is also proposed to perfect and extend the international registration of trade-marks and thus further the reciprocal protection of commercial industries.

Respectfully submitted.

EDWARD B. MOORE,
Commissioner of Patents.

The SECRETARY OF THE INTERIOR.

STATEMENT OF THE COMMISSIONER OF EDUCATION.

STATEMENT OF THE COMMISSIONER OF EDUCATION.

Department of the Interior,
Bureau of Education,
Washington, September 15, 1909.

Sir: I have the honor to submit the following statement of the operations of this office for the fiscal year ended June 30, 1909:

REMOVAL.

A matter of much importance to the bureau was its removal, in July, 1909, from the rented building at the corner of Eighth and G streets, which it had occupied during thirty-five of the forty-two years of its existence, to somewhat more commodious and much more comfortable quarters in the old Post-Office Department building. In the new quarters it has been possible to bring together the members of the several divisions and to arrange the library to advantage for their use. The removal has added largely to the efficiency of the administration of the office. The increase in available space over that in the former quarters is small. Already the library is somewhat cramped and needs additional room for its clerical staff and for the care of the books. It is hoped that by the end of the present fiscal year it may be possible to assign to this bureau additional rooms in this building.

NEW UNDERTAKINGS.

With the transfer of the bureau to its new quarters its staff has been, in a measure, reorganized, and new activities have been undertaken.

Dr. Harlan Updegraff, Chief of the Alaska Division, has been appointed to the position of collector and compiler of statistics. His new work, upon which he will probably enter in December or January, will have to do mainly with the relations of this office to the chief state and city school offices. It is expected that he will act, under the direction of the commissioner, as an adviser in matters relating to school administration. Two additional conferences of chief state and territorial school officers have been held during the past year, one in connection with the meeting of the department of superintendence of the National Education Association at Chicago in February last and the other in connection with the meeting of

the National Education Association at Denver in July of the present calendar year. The first of this series of conferences, held in February, 1908, was mentioned in my annual statement of last year (p. 5).

Mr. James E. McClintock, formerly of the University of Maine, has been appointed specialist in land-grant college statistics, and will have charge of the collection and examination of the reports required by law of the institutions receiving aid from the Federal Government under the provisions of the second Morrill Act and the Nelson amendment. It is expected that Mr. McClintock will devote the major part of his time to the interests of these colleges.

It is believed that the closer relations so established between the Bureau of Education and many of the leading educational offices and institutions of education throughout the country will considerably increase the usefulness of this office. As far as practicable, the new specialists referred to above will be sent into the field, in order that they may become intimately acquainted with such needs as the Bureau of Education may properly serve.

EDITORIAL DIVISION AND DIVISION OF STATISTICS.

The appropriation by the Congress of a sufficient fund for the year ended June 30, 1908, to print two annual reports has enabled the office to bring those reports up to date. The first volume of the report for 1908 was submitted for publication on October 1, 1908, and the second volume on December 31, 1908. Another step toward an earlier issuance of these reports has now been made through the cooperation of the Public Printer, who has agreed to furnish bound copies of volume 1 of the report on December 1 and of volume 2 on March 1 following the close of the school year covered by the report in question.

During the second session of the Sixtieth Congress provision was made for the employment of an editor in this office. Up to the present time the Civil Service Commission has not furnished the name of a suitable person for that position. It will, however, in all likelihood, be filled in the near future.

The Bulletin of the bureau, begun in 1906, continues to receive liberal commendation, and there is a large demand for the numbers which have been issued. The following is a complete list of these issues:

1906.

No. 1. The Education Bill of 1906 for England and Wales, as it passed the House of Commons. By Anna Tolman Smith, of the Bureau of Education. 2d ed., 1907. pp. 48.

No. 2. German views of American education, with particular reference to industrial development. Collated from the Reports of the Royal Prussian Industrial Commission of 1904. By William N. Hailmann, Professor of the History and Philosophy of Education, Chicago Normal School. 2d ed., 1907. pp. 55.

No. 3. State school systems: Legislation and judicial decisions relating to public education, October 1, 1904, to October 1, 1906. By Edward C. Elliott, Professor of Education in the University of Wisconsin. 2d ed., revised, 1907. pp. 156.

1907.

No. 1. The continuation school in the United States. By Arthur J. Jones, Fellow in Education, Teachers College, Columbia University. pp. 157.
No. 2. Agricultural education, including nature study and school gardens. By James Ralph Jewell, sometime Fellow of Clark University. 2d ed., revised, 1908. pp. 148.
No. 3. The auxiliary schools of Germany. Six lectures by B. Maennel, Rector of Mittelschule in Halle. Translated by Fletcher Bascom Dresslar, Associate Professor of the Science and Art of Teaching, University of California. pp. 137.
No. 4. The elimination of pupils from school. By Edward L. Thorndike, Professor of Educational Psychology, Teachers College, Columbia University. pp. 63.

1908.

No. 1. On the training of persons to teach agriculture in the public schools. By Liberty Hyde Bailey, Director of the New York State College of Agriculture, at Cornell University. pp. 53.
No. 2. List of publications of the U. S. Bureau of Education, 1867–1907. pp. 69.
No. 3. Bibliography of education for 1907. By James Ingersoll Wyer, jr., and Martha L. Phelps, of the New York State Library. pp. 65.
No. 4. Music education in the United States: Schools and departments of music. By Arthur L. Manchester, Director of the Department of Music, Converse College, Spartanburg, S. C. pp. 85.
No. 5. Education in Formosa. By Julean H. Arnold, American Consul at Tamsui, Formosa. pp. 70.
No. 6. The apprenticeship system in its relation to industrial education. By Carroll D. Wright, President of Clark College, Worcester, Mass. pp. 116.
No. 7. State school systems: Legislation and judicial decisions relating to public education, October 1, 1906, to October 1, 1908. By Edward C. Elliott. pp. 364.
No. 8. Statistics of state universities and other institutions of higher education partially supported by the State, 1907–8. pp. 15.

1909.

No. 1. Facilities for study and research in the offices of the United States Government at Washington. By Arthur Twining Hadley, President of Yale University. pp. 73.
No. 2. Admission of Chinese students to American colleges. By John Fryer, Professor of Oriental Languages and Literature, University of California. pp. 221.
No. 3. The daily meals of school children. By Caroline L. Hunt. pp. 62.
No. 4. The teaching staff of secondary schools in the United States: Amount of education, length of experience, salaries. By Edward L. Thorndike. pp. 60.
No. 5. Statistics of public, society, and school libraries having 5,000 volumes and over in 1908. pp. 215.
No. 6. Instruction in the fine and manual arts in the United States. A statistical monograph. By Henry Turner Bailey, editor of the School Arts Book. pp. 184.
No. 7. Index to the Reports of the Commissioner of Education. 1867–1907. pp. 103.
No. 8. A teacher's professional library: Classified list of one hundred titles. pp. 14.
No. 9. Bibliography of Education for 1908–9.

Another forward step has been taken during the year toward securing uniformity in educational statistics. Arrangements have been made with the Bureau of the Census for the collection, by special census agents, of financial statistics of the school systems of the larger cities. The statistical form used by the Census Office will be furnished by the Bureau of Education to a number of these cities that can not be reached this year by the census agents. This form is the outcome of a conference between the two offices concerned. It does not differ so widely from those previously in use as to prevent comparison with the statistics of former years. It is still in an experimental stage, but its use by the Census Office and by this office in common is expected to develop any defects or weaknesses in it and to lead to the adoption of a form that will meet the conditions existing in the various cities of the country. Especial interest attaches to the adoption of such a form for the reason that it may be expected to further the keeping of uniform, or at least comparable, statistical records in city systems of schools throughout the country.

LIBRARY DIVISION.

The activities of this division have been mainly directed to the enlargement, organization, and cataloguing of the collections, and to bibliographical work, rather than to the elimination of unsuitable material, the bulk of which had been transferred to the Library of Congress and the District library during the preceding year. The work of removal has continued, however, the total number of pieces transferred amounting to 12,312, as compared with 58,604 in 1907–8. Of the pieces so transferred during the past year, 3,585 were bound volumes.

The practical completion of this transfer of materials no longer required by the bureau has rendered it possible to make a considerable advance in the ordinary activities of the library. The accessions of the year, by gift, by exchange, by purchase, and by binding, number 9,985 volumes and 23,218 numbers of serial and periodical publications, as against 6,831 volumes and 12,771 numbers during the preceding year. There were 5,576 volumes classified and catalogued during the year, as against 3,796 in 1907–8; 12,026 volumes were sent to the bindery as compared with 6,119 in 1907–8. The bibliographical service has more than doubled, 386 bibliographies having been compiled as against 166 during the preceding year. A large number of reference memoranda have also been prepared.

Advantage was taken of the removal of the library to its new quarters to make a complete inventory of the bound volumes which it contains. The number was found to be 47,230. The unbound materials, pamphlets, and serial publications number about 80,000 pieces. With the systematic recording of accessions which has now

been put into effect, a more exact account may be kept of the contents of the collection than was possible in former years.

During some months of the past year a large part of the time of several members of the library staff was devoted to assisting in the preparation of the bureau exhibit for the Alaska-Yukon-Pacific Exposition at Seattle.

DIVISION OF CORRESPONDENCE AND RECORDS.

The work of this division during the year has steadily increased. The number of letters received amounted to 14,452, and the number of documents distributed was 143,315 as against 115,134 during the preceding year. During the year the flat filing system has been installed and has proved entirely satisfactory.

REPORTS REQUIRED BY STATUTE.

Agricultural and mechanical colleges.—Under the acts of Congress approved August 30, 1890, and March 4, 1907, for the more complete endowment and support of colleges of agriculture and the mechanic arts, each of the 50 States and Territories supporting such institutions has received for the year ending June 30, 1910, the sum of $40,000, making a total amount paid out for the year from the Treasury of the United States of $2,000,000. The reports now due from the presidents and treasurers of these institutions have, with a few exceptions, been rendered and are undergoing the usual examination in this office.

The National Education Association.—This association is required by its act of incorporation to make annually to the Commissioner of Education a report stating "the property, real and personal, held by the corporation, and the expenditure or other use or disposition of the same, or the income thereof, during the preceding year." In accordance with this requirement the secretary, Dr. Irwin Shepard, reports, for the year ending June 30, 1909, the value of the total personal property of the association as $11,300; permanent invested fund, $170,000; net revenue from the same, $6,743.17; total receipts for current expenses, $37,418.67; total expenses, $33,609.67; balance June 30, 1909, $3,809.

General Education Board.—The annual financial statement of the General Education Board shows that on June 30, 1909, the principal of the three larger funds under the control of that board, known as the special, the general, and the foundation fund, aggregated $38,537,066.66, a net increase of $223,966.37 over the preceding year. The available income account of the three funds amounted to $3,325,489.21. Of this amount the aggregate of $1,225,098.30 was paid to various educational institutions. The secretary of the board further reports disbursements from four other funds to the amount of $283,789.94.

Porto Rico.—Under the provisions of an act of Congress approved April 12, 1900, the Commissioner of Education for Porto Rico shall make such reports through the governor as may be required by the Commissioner of Education of the United States. I am informed that in accordance with an act of Congress approved July 15, 1909, and an executive order of the same date, the report of the Commissioner of Education for Porto Rico for the fiscal year ended June 30, 1909, has been filed with the Bureau of Insular Affairs of the War Department.

EDUCATION IN ALASKA AND REINDEER FOR ALASKA.

THE ALASKA SCHOOL SERVICE.

During the fiscal year ended June 30, 1909, the Bureau of Education maintained 69 United States public schools for natives of Alaska (of which 10 were established during the fiscal year), with 89 teachers, an enrollment of 3,809, and an average attendance of 1,521. During the two seasons 1908 and 1909, 29 additional buildings for school purposes have been provided, of which 24 are new and permanent buildings.

Efforts have been made to extend medical aid to the natives of Alaska through the employment of nine physicians in widely separated localities throughout the district. In addition to furnishing medical relief to the natives in the vicinity of his headquarters, each of these physicians is required to make tours throughout his district in order to render medical aid to the natives, to introduce sanitary methods of living in the native villages, and to collect vital statistics regarding the natives. Under contracts with hospitals at Nome, Juneau, and Nushagak, many natives received hospital care and treatment during the year. Contracts were also entered into with local physicians in four communities for medical treatment of natives. In addition to the above, the teachers of 29 of the United States public schools in communities where there is no physician were furnished with medical supplies and medical text-books, in order to enable them to give nonprofessional aid to the natives.

Instruction in sewing, cooking, and carpentry has been generally introduced into the schools throughout Alaska. During the summer of 1908 carpenters' tools, sewing machines, cooking utensils, and materials to be used in constructing industrial shops for the entire native communities were sent to Wales, Unalakleet, and Kotzebue. In the southeastern district the schools were also fully supplied with the necessary equipment for manual training, including workbenches and tools.

All vouchers for the expenditures in the Alaska school service and in the Alaska reindeer service have hitherto been sent to Washington to

be paid by the disbursing clerk of the department, causing long delay of payment and consequently, in some instances, higher charges for supplies. To obviate these difficulties a supply and disbursing office of the Alaska school service was established in Seattle, Wash., January 1, 1909, in charge of Mr. Harry C. Sinclair, as supply agent, and with Mr. Alexander H. Quarles as special disbursing agent. This arrangement has resulted in a saving of time and money, which has demonstrated the wisdom of establishing such an office. For the current year, a disbursing office has also been established in Nome, in charge of Mr. Walter C. Shields, as special disbursing agent. The vouchers for expenditures incurred in the Alaska school service and in the Alaska reindeer service north of the Yukon River will be paid from this office.

At its recent session the Congress passed "An act authorizing the Attorney-General to appoint as special officers such employees of the Alaska school service as may be named by the Secretary of the Interior" (approved, May 3, 1909). It is hoped that the special peace officers named under the operation of this act will have such an influence over the natives as to bring about settlements of the most of their difficulties out of court, and that the number of crimes and misdemeanors of the white men against the natives will be greatly reduced.

Now that the schools of Alaska are well equipped for instruction in the industries and domestic economy, the need for a compulsory attendance law is emphasized. The physicians and teachers have no power to enforce among the natives obedience to their instructions regarding sanitary methods of living. In order to make effective the efforts to establish sanitary conditions in the native villages there is urgent need of a law conferring upon the Secretary of the Interior authority to frame a sanitary code applicable to natives of Alaska, and making failure to comply with its provisions a misdemeanor punishable in the courts. A bill containing the provisions outlined has twice been favorably reported to the House. The need of such legislation is most strikingly manifest in case of an epidemic, when a strict quarantine should be enforced in the interest of whites and natives alike.

The following is a summary of expenditures from the fund for "Education of natives of Alaska:"

"*Education of natives of Alaska, 1909.*"

Appropriation		$200,000.00
Salaries of officials and clerks	$10,098.49	
Superintendent northern district	2,100.00	
Two assistant superintendents, northern district, at $1,500 each	3,000.00	
Superintendent southwestern district, January–June	850.00	
Superintendent southeastern district	2,000.00	
Salaries of teachers	66,271.34	
Traveling expenses of inspectors, superintendents, and teachers	13,129.01	

Text-books, stationery, apparatus, furniture, and industrial supplies	$19,497.92	
Fuel and light	6,317.53	
Freight on supplies	5,166.28	
Repairs and rent	4,933.65	
Erection of school buildings	45,984.28	
Erection of industrial shops	1,245.84	
Relief of destitution	7,809.62	
Sanitation and medical relief	7,523.54	
Janitor service	615.55	
Reserved for contingencies	3,456.95	
Total		$200,000.00

Proposed expenditure of appropriation "Education of natives of Alaska, 1910."

Appropriation		$200,000.00
Salaries in Alaska	$90,000.00	
Equipment and supplies in Alaska	8,500.00	
Fuel and light	11,000.00	
Traveling expenses	12,000.00	
Freight	5,500.00	
Repairs, rent, and nonpersonal services	4,500.00	
Janitor service	1,000.00	
Local expenses	1,900.00	
Buildings	28,000.00	
Medical relief	17,000.00	
Destitution	7,000.00	
Commissioner's office salaries	7,000.00	
Commissioner's office expenses	600.00	
Seattle office salaries	5,500.00	
Seattle office expenses	500.00	
Total		200,000.00

THE ALASKA REINDEER SERVICE.

New reindeer herds were established during the year ending June 30, 1909, at eight points, making with the 23 herds previously established a total of 31 herds.

Reports for the fiscal year ended June 30, 1909, have as yet been received from only 14 of these herds. The total number of domestic reindeer in Alaska June 30, 1908, was 19,322, of which the United States owned 22 per cent, missions 18 per cent, Lapps 14 per cent, and natives 46 per cent. Taking the percentage of increase during 1908 as a guide, it is estimated that there should now be in Alaska a total of about 23,000 reindeer.

There is every indication that the policy of making a more rapid distribution of the reindeer among the Alaskan natives, which has been pursued during the past two years, is proving successful and beneficial.

The following is a summary of expenditures in the Alaska reindeer service:

Expenditure of appropriation "Reindeer for Alaska, 1909."

Appropriation		$15,000.00
For salaries of chief herders	$2,335.00	
Support of apprentices	9,080.09	
Establishment of new herds	1,215.00	
Freight on supplies	1,447.49	
Miscellaneous	506.85	
Reserved for contingencies	415.57	
Total		15,000.00

Proposed expenditure of appropriation "Reindeer for Alaska, 1910."

Appropriation		$12,000.00
Salaries of chief herders	$2,000.00	
Supplies for apprentices	9,000.00	
Establishment of new herds	1,000.00	
Total		12,000.00

APPROPRIATIONS AND NEEDS.

The appropriations made for the general work of the Bureau of Education for eleven years, including the appropriations for the current fiscal year, are shown in the following table:

Appropriations for Bureau of Education.

Year.	Salaries.	Library.	Distributing documents.	Collecting statistics.	Rent.	Printing of annual reports.[a]	Total.
1900	$52,020	$250	$2,500	$2,500	$4,000	$32,922	$94,192
1901	53,620	250	2,500	2,500	4,000	33,444	96,314
1902	54,120	250	2,500	2,500	4,000	34,466	97,836
1903	54,740	250	2,500	2,500	4,000	31,280	95,270
1904	52,940	250	2,500	2,500	4,000	31,800	93,990
1905	52,940	250	2,500	2,500	4,000	32,740	94,930
1906	53,140	250	2,500	2,500	4,000	34,000	96,390
1907	54,940	250	2,500	2,500	4,000	20,000	84,190
1908	55,500	250	2,500	4,000	4,000	40,000	106,250
1909	56,500	500	2,500	4,000	4,000	20,000	87,500
1910	61,200	500	2,500	4,000	4,000	22,500	94,700

[a] From 1900 to and including 1906 the sums given represent the actual cost of the bureau's quota of the annual reports, which was paid from the appropriation for printing and binding for Congress. Since 1906 Congress has limited the amount that may be expended in the publication of each annual report. In 1908 provision was made for the publication of two reports, in order to bring such publications up to date.

The total amount appropriated for the bureau for the current year is larger by $7,200 than that for the preceding year. On account of the removal of the bureau to a government-owned building, however, nearly all of the amount appropriated for rent will be turned back into the Treasury, making the total amount available for the purposes of the bureau only $91,033.33. The need of largely increased appropriations, in order to enable the bureau to do the work for which it was created and for which it is in fairness responsible to

the educational interests of the country, is a very urgent need. Among the additions immediately called for are the following:

1. The addition of competent experts in higher education, industrial education, state school systems, and the welfare of children, with a sufficient force of clerical assistants.

2. Provision for the conduct of special educational investigations and inquiries.

3. An increase in the appropriation for the purchase of books and an appropriation for the purchase of metal shelving for the library of the bureau.

All of which is respectfully submitted.

ELMER ELLSWORTH BROWN,
Commissioner.

The SECRETARY OF THE INTERIOR.

REPORT OF THE DIRECTOR OF THE UNITED STATES GEOLOGICAL SURVEY.

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GEORGE OTIS SMITH, *Director.*

The appropriations for the work of the United States Geological Survey for the fiscal year 1908–9 comprised items amounting to $1,590,680. The plan of operations was approved by the Secretary of the Interior, and a detailed statement of the work of the various branches and divisions of the Survey is presented on later pages of this report.

SPECIAL FEATURES OF THE WORK.

PROGRESS IN LAND CLASSIFICATION.

Land classification in aid of the administration of the public lands has been for several years and is now actively prosecuted by the Geological Survey, and reports setting forth in detail the mineral or nonmineral character of public lands of which the Survey has made actual field examination are being transmitted to the General Land Office.

Another and more recent line of activity in land classification is the segregation of nonirrigable lands under the terms of the enlarged homestead act of February 19, 1909. The recommendations of the Geological Survey on which the Secretary of the Interior bases his designations have not depended on surveys made for this specific purpose, but on data collected through a period of many years by federal geologists and engineers. The existence of this information whereby, within the few months since the enactment of the law, the Secretary has been able to designate areas in 9 States and Territories aggregating 162,000,000 acres, is in itself a forceful argument for a land classification that is complete and authoritative.

This classification of the public lands serves two important ends, one administrative, the other legislative, and it is believed that both were contemplated by Congress at the time of the creation of the Survey. The classification of the public domain and the investigation of its resources not only facilitate the work of fulfilling the

requirements of existing law, but also furnish Congress with data on which to base new legislation and particularly aid in the development in the land laws of the principle of relative worth, which is that the land must be so disposed of or so reserved as to insure utilization for the purposes for which it is most valuable. No principle is more fundamental to real conservation and at the same time more beneficial to the mining and other industries than this of giving preference to the highest possible use for the public lands. The earliest land laws, those of a century ago, provided for the reservation of mineral lands from disposal for other purposes, and the present coal-land law expresses this principle of relative worth by giving gold, silver, and copper deposits priority over the coal, and coal in turn preference over agricultural values. With classification data at hand the principle of relative worth can be further developed. Wherever the different values conflict the higher use should prevail. On the other hand, wherever the different values can be separated that separation by appropriate legislation is at once the easiest and best solution of the problem; for instance, the surface rights may be separated from the right to mine underlying beds of coal. The first step in this direction was taken in March of this year in the passage of the Mondell Act for the protection of the surface rights of entrymen, whereby the homeseeker may secure all for which he made entry—all that he swears he is getting—while the coal beneath his tillable land is reserved to the nation for future disposal. Land legislation of the future should strengthen this principle of relative worth where it already exists in law and introduce it further in all new legislation.

As an instance where thorough knowledge of the character of a special public-land tract with its strategic relation to the hydrography of the region enabled the Department of the Interior to aid Congress may be cited the act of February 20, 1909, reserving for public use eight sections of waste land in southern California. The law provides that this land shall be used for the diversion of flood waters into underground storage, thereby replenishing the supply of underground waters in the San Bernardino Valley. While apparently of only local scope, the principle established in this legislation is really of great importance as providing a course of action that will be found adaptable elsewhere in securing effective conservation of flood waters.

Hydrographic and topographic surveys which are now in progress under the instructions of the Secretary of the Interior have as their purpose the collection of information that may be presented to Congress in aid of legislation looking toward the best utilization of the water powers of the public domain. The information available as to the undeveloped water powers of the United States is far from complete, but to a very large extent it represents the work of the

water-resources and topographic branches of the Geological Survey. With these earlier records and surveys as a basis the Survey is now actively engaged in examining power sites to which the Government still retains the title. Those who are making this study of the water-power problem fully realize that economical utilization of these natural stores of energy requires their development on a large scale, with the investment of capital in large amounts. The day is past for inexpensive developments where only the minimum flow is used and that inefficiently. With the present demand for unfailing power in mind, we need not look far into the future to see storage as a universal factor in water-power development. Utilization of the undeveloped water powers on the public domain, therefore, involves either government development or long-time leases of these power sites to strong financial interests, and in the latter event the law must provide for effective government control which will insure that the profit to the capital accomplishing the development can not impose unjust burdens on the users of the power, whether the utilization be for transportation, city lighting, or motive power.

The purpose of the coal land classification surveys is twofold—to expedite complete restoration to agricultural entry of land thus determined to be barren of coal although included in the general withdrawals, and to promote the utilization of the coal lands, which to-day represent the greatest natural resource to which the people retain an unquestioned title. The geologic investigations of the last three field seasons have not only furnished a knowledge of the quantity and quality of the coal on the public domain, but have rendered possible the present policy of obtaining coal prices for coal lands. The General Land Office now depends on the Geological Survey to furnish detailed valuations for every 40-acre tract of coal land that is placed on the market. It is conceded that this policy of basing the price on the quantity and quality of the article sold will discourage purchase by speculators, but there is no reason to believe that the government valuation will impede the disposition of the coal deposits for purposes of utilization. The real development of the West will be promoted, not retarded. The situation is clearly viewed by the editor of a western mining journal, who has recently stated that this increase in valuation "can produce but one result—the lands will be sold only as they are actually needed for mining purposes. This should reduce the danger of monopoly, without promoting overproduction and wasteful competition. In the end it should give future generations cheaper coal. The unearned increment will go in part to the nation rather than to individuals." If a scientific classification and adequate valuation of the coal lands will accomplish all this, what more can be asked?

The scale on which this work is being prosecuted is indicated by the record of the three and a half months following the adoption of the revised scheme of valuation; in this period, which includes July of the next fiscal year, the recommendations to the General Land Office resulted in the release to agricultural entry of approximately 6,875,000 acres of noncoal land in Colorado, Wyoming, and Montana, and placed selling prices on nearly 1,500,000 acres of coal land with an aggregate valuation of nearly $94,000,000, which is an average advance of more than 200 per cent over the minimum prices fixed by law. Under the regulations setting forth the plan of valuation of government coal land the price is determined on the basis of estimated tonnage, and the unit rate varies with the quality of the coal, ranging from half a cent to 3 cents a ton for deposits within 15 miles of a railroad. The prices thus calculated range from 5 to 30 per cent of the usual royalty paid in the West, which is uniform without regard to the quality of the coal, yet this conservative valuation will more than double the average price of public coal lands, not to mention the fact that this policy of land classification has stopped the illegal disposal of coal lands at even less than the minimum coal price. Exceptional cases like one in Wyoming might be cited where the average price based on tonnage represents a fifteenfold increase over the old minimum price. Sales are being made at the new prices, and the reports from one land office already indicate a greater activity in coal lands priced at $25 and $50 an acre than existed a few years ago when they were sold at the minimum price of $10 and $20.

In the western oil fields the classification work by the Survey has resulted in protecting the oil man from the agricultural claimant, and with a better law the reports of the Survey geologists would also protect the oil prospector from the devices of the gypsum entryman. The next move on the part of the Federal Government in its capacity as the present owner of a large acreage of oil lands should be to protect the oil industry from itself by preventing injury to future productiveness through reckless drilling and by discouraging production in advance of possible disposal.

ORGANIZATION OF LAND-CLASSIFICATION BOARD.

When the Survey undertook the classification of the public lands in the West, both field examination and actual classification were made by the field geologists. After several years' experience it was found that the resulting classifications were not consistent among themselves, and the necessity was recognized for a uniform standard which should consistently conform to the policy of the Department. Also the classification work was extended to cover not only coal lands, but oil and gas and phosphate lands, enlarged homestead entries, and water-power sites, and the proper coordination of all this work be-

came important. Furthermore, the records had become cumbersome and complicated, so that it was necessary to provide a common custodian for them. These considerations led to the organization of a land-classification board in December, 1908.

This board consists of a general advisory section and such classification sections as may be established from time to time to deal with any particular class of public lands. The chairman of the general board is also chairman of the several classification sections and is in charge of the office force and records.

The advisory board, which is charged with consideration of questions of policy and approval of standards only, consists of the chairman and the chiefs of sections and branches in charge of the field work on which the classification of the board are based. Its personnel is as follows: A. C. Veatch, chairman; C. W. Hayes, chief geologist; M. O. Leighton, chief hydrographer; M. R. Campbell, chief of section of economic geology of fuels; and Waldemar Lindgren, chief of section of metalliferous ores.

The actual classifications are made by sections composed of three members, the chairman of the board and two members specially qualified in each case to deal with the questions involved in the classification. These sections are at present constituted as follows:

Coal: C. A. Fisher and G. H. Ashley.
Oil: M. J. Munn and Robert Anderson.
Phosphate: F. B. Van Horn and E. O. Ulrich.
Metalliferous deposits: H. D. McCaskey and F. L. Ransome.
Nonirrigable lands: W. C. Mendenhall and J. C. Hoyt.

When the board was created the records of withdrawals and classifications were incomplete and involved. The increasing complexity of the work demanded readily accessible records, which should show completely and accurately every action taken in regard to any tract of land. Such a record is now in course of preparation. With the hearty and efficient cooperation of the General Land Office the complete records on file in that office are being checked with the records of the Survey, and it is expected that before the end of the next fiscal year the township card catalogue, showing every action taken with regard to any land in each township in the public-land States, will be completed.

With regard to new work in coal, phosphate, oil, enlarged homesteads, and power sites the plan has been adopted of keeping ledger accounts of each class of work, from which the total acreage, classified by months and by States, and in case of coal lands the relation between the prices as fixed by law, can be expeditiously determined. These ledger accounts will be extended to the past work as rapidly as possible, and when completed will give detailed statistics, correct to date and immediately available. As a card record, though necessary to

preserve all the details regarding actions affecting individual tracts, is nothing more than a jumble of numbers which must be plotted on maps to give an idea of relative areas and locations, a system of small-scale graphic index State maps has been installed, which are brought up to date the first of each month. These graphic records have proved of great value and have been freely used by the Department.

INVESTIGATION OF WATER RESOURCES.

Investigation of the water resources of the United States, together with a study of the uses to which they may best be adapted, has been continued by the water-resources branch along the general lines previously laid down. The work and its significance have, however, broadened materially. Many of those who formerly expressed doubt concerning its utility now realize that it is indispensable to the intelligent development of the country's water resources, whether that development be for power, navigation, irrigation, flood control, or domestic water supply. It requires no technical training to appreciate the necessity for finding out what and how much water is available for use, where it is, and how it can best be directed in the course of profitable development and utilization.

During the earlier period almost the only real appreciation of the work shown by even well-informed people was that in connection with its utility in the arid country. To-day the arid West has no monopoly of general interest in water problems. Inland navigation is enthusiastically advocated by the people at large, who have developed a great unanimity with reference to general policy in this matter. But little less interest is shown in the matter of water power, which, by reason of improvements in electric transmission, has been changed in its position in the public economy from a purely local agent to a great public utility. It is therefore no longer necessary to argue that the investigation of water resources is a necessity, and it is becoming more and more apparent that such a study constitutes one continuous problem, which is not confined within state lines and can not be divided up into districts, and that the work therefore, if it is to be efficiently performed, must be performed by the Federal Government.

The timeliness of the work that has been done and the results that have accumulated in past years were well illustrated in the investigations of the National Conservation Commission. All inquiries of the commission concerning stream flow, water power, floods, and underground waters, as well as the greater number of those concerning irrigation and drainage, were referred to the water-resources branch of the Survey. To have procured the information anew would have taken several years and necessitated the expenditure of a very large amount of money. By reason of its previous work, however, the water-resources branch was able to give comprehensive statements and

reports on the topics concerning which information was desired. The contribution to the conservation report was therefore a mere rounding up of material which was available for publication through the regular channels and which would have been so published had not this opportunity for a field of larger usefulness presented itself; in other words, this contribution was neither more nor less than a progress report.

The scope of the water-resources investigations has recently proved to be of national significance in two important respects. The first is the necessity for the data gathered in conection with the administration of the enlarged homestead act, passed by the Sixtieth Congress. This act authorizes the Secretary of the Interior to open to entry, in homesteads of 320 acres, all public lands that are nonirrigable or impracticable of irrigation except with the expenditure of a disproportionate amount of money. It is obvious that the proper administration of this act requires at the outset a knowledge of the available water supplies. Without such information the act is practically nonadministrable. The second national feature dependent on these investigations is the temporary withdrawal, under the authority of the President, pending legislative action, of water-power sites along the rivers of the public domain. The extent and value of any water power depend on the amount of water that the stream furnishes. To withdraw from entry power sites on the public domain intelligently would be impossible without definite information, and, were not available data at hand, the propositions for withdrawal would involve a gigantic piece of investigation that could not be finished for a long term of years. It is true that information is lacking regarding a large number of important sites on the public domain, but it is also true that by the aid of the information which the Survey had collected during past years it has been possible to withdraw a large number of power sites immediately, and many more can be withdrawn in the near future, by reason of the fact that partial information is now available and can soon be made practically complete. It is believed by many that the protection and proper administration of the great water-power sites of the public domain constitute one of the most important projects of the present administration. The people are becoming each day more dependent, for their industrial productivity as well as for their comfort and happiness, on the energy available for development and partly developed in our streams. The circumstances present in a clear fashion one convincing line of evidence as to the necessity for carrying this work forward to a purposeful finish.

TOPOGRAPHIC SURVEYS.

The popular appreciation of topographic surveys, as witnessed by the steady increase in sales of the Survey maps, is believed to be indicative of the increased efficiency of the topographers. Other rec-

ognition of the high standards attained has come in the calls for the topographers of the Survey to take up similar work in other countries. Not only have members of the topographic branch been detailed to work under the international boundary commissions, on the Porto Rico Irrigation Survey, and for the Isthmian Canal Commission, but Survey topographers have resigned or taken leave of absence to make topographic surveys in Mexico, Honduras, Peru, Africa, and China. The latest and possibly most notable instance of appreciation of the topographic work of this Government has been the request from the Director of the Canadian Geological Survey for the temporary assignment of one or more of the most experienced topographers to be employed by the Canadian Survey in the inauguration of similar topographic work. In Canada one topographer is at present on leave of absence and acting in the capacity of field instructor to several of the Canadian parties.

MINE ACCIDENTS.

Within three months after the appropriation by Congress " for the protection of lives of miners in the Territories and in the district of Alaska, and for conducting investigations as to the causes of mine explosions with a view to increasing safety in mining " (approved May 22, 1908), the mine-accidents division of the technologic branch of the Geological Survey had been organized, a large part of its equipment had been installed in the government buildings on the arsenal tract at Pittsburg, and the investigations into the causes of mine explosions were already under way.

With a view to profiting as far as possible by the experience in other countries, two of the Survey engineers visited the coal-mining regions in England, Scotland, and Wales during August, and one of them extended his investigations through the coal-mining regions of France, Belgium, and Germany during September and October. In addition to this, three of the countries which had done most in reducing the loss of life in mining—Great Britain, Belgium, and Germany—were invited by this Government to send to the United States their most experienced officers in mine-safety work to advise this Survey as to its plans for these investigations. The invitation received favorable action; the three experts came to the United States about the end of August, and after examining the plans and equipment of the mine-experiment station that was being established at Pittsburg, visited a number of the more important coal fields of the country and presented to the Secretary of the Interior a report embodying in condensed form their recommendations looking to greater safety in American coal mines. This report was promptly published and widely distributed throughout the United States to persons interested in the mining industry.

The investigations conducted at the Pittsburg station during the fiscal year have included (*a*) an examination of explosives used in coal mining in the United States; (*b*) an examination into the occurrence of explosive gases and inflammable or explosive dust, and a special examination of those mines in which explosions have occurred during the year; (*c*) an examination of so-called safety lamps used in mines in the United States, and of mine rescue apparatus for use in mines filled with poisonous and explosive gases; (*d*) a study of the conditions under which electricity may be safely used in coal mines where either gas or inflammable dust abounds.

In these investigations the Survey has had throughout the year the hearty cooperation of the miners, mine operators, and state inspectors. It is believed that decided progress has been made in determining the causes and means of preventing such disasters.

The manufacturers of explosives used in coal mining have voluntarily submitted their explosives for testing at the station and have withdrawn from the market a number of explosives that failed to pass these tests. They have also made commendable efforts to increase the safety of their explosives even beyond the requirements of these tests, and have shown a desire to carry out the wishes of the state inspectors and the recommendations of the federal engineers and chemists connected with these investigations.

It is hoped that the maximum in the loss of life in coal mining in the United States has been reached and that hereafter, with the basis for intelligent action furnished by these investigations and with the hearty cooperation of all those interested in mining, there will be a steady yearly decline in the loss of life in this country from explosions. But in view of the fact that more than 85 per cent of the fatalities in our coal mines are due not to explosions, but to other though in many cases related causes, it is important that the scope of the investigation be extended to include all conditions which make for greater safety in mining.

TECHNOLOGIC INVESTIGATIONS FOR THE GOVERNMENT.

During the year the demands on the Geological Survey for special services to other branches of the Government have steadily increased. In connection with the fuel resources of the country there has been a call for information concerning not only the fuel supplies on the public lands but also the fuels for use by different branches of the government service. The larger part of the fuel used by the Government (other than that used on board naval vessels), involving an annual expenditure of more than $5,000,000, is now purchased under specifications prepared by the Survey, and this coal is sampled and tested by members of the Survey. The supplies of coal for use on government vessels are to an increasingly large extent being

purchased from mines which have been examined and whose coals have been tested by the Survey. The supplies of crude petroleum and other mineral fuels for the government service are also being subjected to similar examination.

In connection with the building and engineering construction work done by the Government, the materials to be used are now being generally tested by the Survey. These include materials for more than 300 public buildings in various States and Territories, recently authorized by Congress and involving an expenditure of more than $50,000,000. The cement, sand, stone, and other structural materials for use in the engineering work of the Panama Canal, as well as structural materials for use by the Reclamation Service and by several bureaus of the army and the navy, are also being examined at the testing laboratories of the Survey at St. Louis and Pittsburg.

DISTRIBUTION OF PUBLICATIONS.

The realization that the Survey publications which embody the results of the investigations and surveys can serve their purpose only as wise and prompt distribution is effected has caused special attention to be given to this phase of administration. The results attained are gratifying. In the distribution of reports the increase was nearly 10 per cent over that of the preceding year and the number of volumes distributed equaled the number of copies received from the Public Printer. The whole number of topographic maps distributed exceeded that of 1907–8 by over 25 per cent, and the sales of geologic folios and of topographic sheets showed an increase of 25 per cent and 20 per cent, respectively.

SURVEY LIBRARY.

In the Survey library the constant aim has been to make the collection complete in the literature properly belonging to a geologic library; to keep it up to date by promptly procuring all the necessary new publications; and to catalogue punctually the new accessions, thus making them readily available for use. With small funds, a working force necessarily limited, and shelf room so meager that continual shifting of books is necessary to incorporate new accessions in proper order, no remarkable increase in size or achievement is possible. The best efforts of the force are so fully engaged in meeting from day to day the demands for information and publications that only occasional opportunity is left for new undertakings that may increase the library's usefulness. The Survey has a collection of geologic, paleontologic, and mining literature which certainly is not approached in completeness by any other library in this country, and, at least as to American geology, probably not by any other in the

world. It is gratifying to know that practical geologists, professors, and students throughout the country recognize the usefulness and completeness of this collection and frequently avail themselves of its resources, particularly of the rare material not to be found elsewhere in the United States.

INADEQUACY OF RENTED BUILDINGS.

The work of the scientific, technical, and clerical employees of the Survey is becoming more and more hampered through the conditions imposed by the quarters occupied. The two fires within the past fiscal year were fortunately extinguished with an aggregate material loss of less than $20,000, but the work of several divisions was much delayed by reason of these fires. Not only is there this constant danger that public records conservatively valued at nearly $5,000,000 may be destroyed by fire, but the space available is both ill adapted and insufficient for the present needs. The proportion of dark rooms necessitates use of artificial light, which in turn affects the quality and quantity of work and injures the eyesight and health of the employees. Furthermore, the present crowded condition of the rooms is curtailing the efficiency of the geologists and other specialists of the Survey, who are engaged in work of the greatest importance to the nation. The erection of a well-lighted, fireproof building of adequate size, planned to meet the requirements of a scientific bureau, has become the greatest need of the Geological Survey.

WORK OF THE YEAR.

PUBLICATIONS.

The Survey is a bureau of investigation and publication, and the current publications furnish an important index to the nature and value of its work. Summaries of the publications other than topographic maps issued during the last fiscal year follow:

Twenty-ninth Annual Report of the Director of the United States Geological Survey to the Secretary of the Interior, for the fiscal year ended June 30, 1908. v, 99 pp., 2 pls.

A summary of the work of the year, by branches and divisions, with notes on special features, brief sketches of the publications, and maps showing areas covered by geologic and topographic surveys.

Professional Paper 58. The Guadalupian fauna, by George H. Girty. 651 pp., 31 pls.

An account, with description and figures, of the fauna found in the Texas portion of the Guadalupe Mountains, a facies strikingly individual among known Carboniferous faunas. The introduction contains a summary of literature dealing with other Carboniferous faunas in various parts of the world.

Professional Paper 59. Contributions to the Tertiary paleontology of the Pacific coast. I. The Miocene of Astoria and Coos Bay, Oregon, by William H. Dall. 278 pp., 33 pls., 14 text figures.

The first of a projected series of contributions to a better knowledge of the Tertiary faunas of the Pacific States. Contains descriptions and figures of fossils, including an account by F. W. True of a remarkable fossil sea lion. As appendices are reprinted several rare papers on the paleontology of the Pacific coast Tertiary, followed by a bibliography of publications on the post-Eocene marine mollusks of the northwest coast, 1865–1908.

Professional Paper 60. The interpretation of topographic maps, by Rollin D. Salisbury and Wallace W. Atwood. 84 pp., 170 pls., 34 text figures.

A clear explanation of the features shown on the topographic and geologic maps published by the Survey and of the conventions used to represent those features, accompanied by a large number of illustrative maps with text indicating the inferences as to the topography, geology, and physiographic history that may be legitimately drawn from the maps.

Professional Paper 61. Glaciation of the Uinta and Wasatch mountains, by Wallace W. Atwood. 96 pp., 15 pls., 24 text figures.

An outline of the topography and geology of the two ranges, with detailed notes on the glacial phenomena, illustrated by geologic and topographic maps, half-tone views, and numerous sketch maps and diagrams.

Professional Paper 62. The geology and ore deposits of the Cœur d'Alene district, Idaho, by Frederick L. Ransome and Frank C. Calkins. 203 pp., 29 pls., 23 text figures.

The introduction, by Mr. Ransome, contains an outline of the geography and geology of northern Idaho and adjacent parts of Montana and Washington, a sketch of industries and settlements in the Cœur d'Alene district, and a bibliography, and is followed by detailed accounts of the general geology by Mr. Calkins and of the ore deposits and mines by Mr. Ransome. The report is illustrated by detailed and sketch maps, diagrams, sections, half-tone views, and photomicrographs of ores and rocks.

Professional Paper 63. Economic geology of the Georgetown quadrangle, Colorado, by Josiah E. Spurr and George H. Garrey, with general geology by Sydney H. Ball. 422 pp., 87 pls., 155 text figures.

An elaborately illustrated report on a well-known mining region, containing an account of the general geology, a discussion of the principles governing mineralization in this and related regions, notes on the history and statistics of production of the mines, and detailed descriptions of the mines by districts. The illustrations comprise maps showing the present topography, the geology, and the physiographic history of the region, mine plans and sections, sketches and views of rocks and ores, and numerous half-tone views.

Bulletin 340. Contributions to economic geology, 1907. Part I. Metals and nonmetals except fuels; C. W. Hayes and Waldemar Lindgren, geologists in charge. 482 pp., 6 pls., 26 text figures.

Introductory papers by Messrs. Hayes and Lindgren summarize the publications and field work of the year bearing on nonmetallic mineral resources except coal, lignite, and peat, and on deposits of metalliferous ores. The body of the volume comprises the following papers:

A geological analysis of the silver production of the United States in 1906, by Waldemar Lindgren.

Notes on some gold deposits of Alabama, by H. D. McCaskey.

The mineral deposits of the Cerbat Range, Black Mountains, and Grand Wash Cliffs, Mohave County, Ariz., by F. C. Schrader.

Gold placer deposits near Lay, Routt County, Colo., by H. S. Gale.

Gold deposits of the Little Rocky Mountains, Montana, by W. H. Emmons.

Geology and mineral resources of the Osceola mining district, White Pine County, Nev., by F. B. Weeks.

The mines of the Riddles quadrangle, Oregon, by J. S. Diller and G. F. Kay.

Notes on copper deposits in Chaffee, Fremont, and Jefferson counties, Colo., by Waldemar Lindgren.

Notes on the Fort Hall mining district, Idaho, by F. B. Weeks and V. C. Heikes.

Mineral resources of northeastern Oklahoma, by C. E. Siebenthal.

Some molybdenum deposits of Maine, Utah, and California, by F. L. Hess.

The Arkansas antimony deposits, by F. L. Hess.

Antimony in southern Utah, by G. B. Richardson.

Carnotite and associated minerals in western Routt County, Colo., by H. S. Gale.

Tungsten deposits in the Snake Range, White Pine County, eastern Nevada, by F. B. Weeks.

Note on a tungsten-bearing vein near Raymond, Cal., by F. L. Hess.

Monazite deposits of the Carolinas, by D. B. Sterrett.

Minerals of the rare-earth metals at Baringer Hill, Llano County, Tex., by F. L. Hess.

Tin ore at Spokane, Wash., by A. J. Collier.

An estimate of the tonnage of available Clinton ore in the Birmingham district, Alabama, by E. F. Burchard.

Three deposits of iron ore in Cuba, by A. C. Spencer.

Iron ores near Ellijay, Ga., by W. C. Phalen.

The Miner ranch oil field, Contra Costa County, Cal., by Ralph Arnold.

Petroleum in southern Utah, by G. B. Richardson.

Gas fields of the Bighorn Basin, Wyoming, by C. W. Washburne.

The Labarge oil field, central Uinta County, Wyo., by A. R. Schultz.

Marble of White Pine County, Nev., near Gandy, Utah, by N. H. Darton.

Concrete materials produced in the Chicago district, by E. F. Burchard.

Portland cement materials near El Paso, Tex., by G. B. Richardson.

Clays in the Kootenai formation near Belt, Mont., by C. A. Fisher.

Tripoli deposits near Seneca, Mo., by C. E. Siebenthal and R. D. Mesler.

Phosphate deposits in the western United States, by F. B. Weeks.

Sulphur deposits at Cody, Wyo., by E. G. Woodruff.

A commercial occurrence of barite near Cartersville, Ga., by C. W. Hayes and W. C. Phalen.

Graphite deposits near Cartersville, Ga., by C. W. Hayes and W. C. Phalen.

Meerschaum in New Mexico, by D. B. Sterrett.

Bulletin 341. Contributions to economic geology, 1907. Part II. Coal and lignite; Marius R. Campbell, geologist in charge. 444 pp., 25 pls., 7 text figures.

Contains an introduction by Mr. Campbell, giving an outline of the geologic work in the coal fields of the country during 1907, followed by the papers named below:

The Sentinel Butte lignite field, North Dakota and Montana, by A. G. Leonard and C. D. Smith.

The Miles City coal field, Montana, by A. J. Collier and C. D. Smith.

The Bull Mountain coal field, Montana, by L. H. Woolsey.

Coal near the Crazy Mountains, Montana, by R. W. Stone.

The Red Lodge coal field, Montana, by E. G. Woodruff.

The Lewistown coal field, Montana, by W. R. Calvert.

The Sheridan coal field, Wyoming, by J. A. Taff.

The Glenrock coal field, Wyoming, by E. W. Shaw.

Coal fields of the northeast side of the Bighorn Basin, Wyoming, and of Bridger, Mont., by C. W. Washburne.

Coal fields of the southwest side of the Bighorn Basin, Wyoming, by E. G. Woodruff.

The eastern part of the Great Divide Basin coal field, Wyoming, by E. E. Smith.

The western part of the Little Snake River coal field, Wyoming, by M. W. Ball.

The northern part of the Rock Springs coal field, Sweetwater County, Wyo., by A. R. Schultz.

Coal fields of northwestern Colorado and northeastern Utah, by H. S. Gale.

The Grand Mesa coal field, Colorado, by W. T. Lee.

The coal field between Gallina and Raton Spring, N. Mex., in the San Juan coal region, by J. H. Gardner.

The coal field between Durango, Colo., and Monero, N. Mex., by J. H. Gardner.

The coal field between Gallup and San Mateo, N. Mex., by J. H. Gardner.

The Harmony, Colob, and Kanab coal fields, southern Utah, by G. B. Richardson.

The Rogue River valley coal field, Oregon, by J. S. Diller.

A coal prospect on Willow Creek, Morrow County, Oreg., by W. C. Mendenhall.

The Pocket coal district, Virginia, in the Little Black Mountain coal field, by C. A. Fisher.

Classified list of papers dealing with coal, coke, lignite, and peat, contained in publications of the United States Geological Survey, except those on Alaska, by W. T. Lee and J. M. Nickles.

Bulletin 345. Mineral resources of Alaska, report on progress of investigations in 1907, by Alfred H. Brooks and others. 294 pp., 5 pls., 7 text figures.

Contains fourteen different papers by eleven different authors, including (1) summaries of progress of the mining industry in various parts of the Territory during the year, (2) preliminary accounts of investigations in progress or completed, and (3) statements of the results of minor investigations not to be published elsewhere. A list of the papers with their authors follows:

The distribution of mineral resources in Alaska, by A. H. Brooks.

The mining industry in 1907, by A. H. Brooks.

Prospecting and mining gold placers in Alaska, by J. P. Hutchins.

Lode mining in southeastern Alaska, 1907, by C. W. Wright.

Copper deposits in Kasaan Peninsula, Prince of Wales Island, by C. W. Wright and Sidney Paige.

The building stones and materials of southeastern Alaska, by C. W. Wright.

Mineral resources of the Kotsina and Chitina valleys, Copper River region, by F. H. Moffit and A. G. Maddren.

Notes on copper prospects of Prince William Sound, by F. H. Moffit.

Occurrence of gold in the Yukon-Tanana region, by L. M. Prindle.

The Fortymile gold-placer district, by L. M. Prindle.

Water supply of the Fairbanks district, 1907, by C. C. Covert.

Investigations of the mineral deposits of Seward Peninusla, by P. S. Smith.

The Seward Peninsula tin deposits, by Adolph Knopf.

The mineral deposits of the Lost River and Brooks Mountain region, Seward Peninsula, by Adolph Knopf.

Water supply of the Nome and Kougarok regions, Seward Peninsula, 1906–7, by F. F. Henshaw.

Bulletin 346. Structure of the Berea oil sand in the Flushing quadrangle, Harrison, Belmont, and Guernsey counties, Ohio, by W. T. Griswold. 30 pp., 2 pls.

A report of the results of work undertaken to determine the position in all parts of the Flushing quadrangle of the principal oil sand and thus to ascertain where the conditions are favorable for the accumulation of oil and gas. Contains two maps showing by contours the depth of the oil sand and the structure of the Pittsburg coal, an important key bed.

Bulletin 347. The Ketchikan and Wrangell mining districts, Alaska, by F. E. Wright and C. W. Wright. 210 pp., 12 pls., 23 text figures.

A reconnaissance report on the distribution, character, and relative importance of the ore bodies and ore-bearing formations in this region, with detailed descriptions of the various mines and prospects. The illustrations include three large maps and many smaller ones.

Bulletin 348. Coal resources of the Russell Fork basin in Kentucky and Virginia, by Ralph W. Stone. 127 pp., 8 pls., 25 text figures.

A detailed description of the Elkhorn coal district in Virginia, with sketches of the geography and general geology, illustrated by maps and numerous sections of coal beds.

Bulletin 349. Economic geology of the Kenova quadrangle, Kentucky, Ohio, and West Virginia, by W. C. Phalen. 158 pp., 6 pls., 21 text figures.

Descriptions of the topography, geology, and mineral resources by districts, with an account of the transportation facilities and the extent and development of the mines. Contains structure sections of coals and other illustrations.

Bulletin 350. Geology of the Rangely oil district, Rio Blanco County, Colo., with a section on the water supply. 61 pp., 4 pls., 1 text figure.

A review of the geology in detail, with descriptions of the oil fields and water supply and a discussion of the economic development of the district. The illustrations consist of topographic and geologic maps.

Bulletin 351. The clays of Arkansas, by John C. Branner. 247 pp., 1 pl., 20 text figures.

A description of the topography and geology of the State, and of the character, origin, occurrence, and uses of Arkansas clays, with a table showing the value of the clay products and a list of the clay workers. Contains structure sections of various districts.

Bulletin 352. Geologic reconnaissance of a part of western Arizona, by W. T. Lee, with notes on the igneous rocks of western Arizona, by Albert Johannsen. 96 pp., 11 pls., 16 text figures.

Geographic and geologic details of the highlands and valleys of the area, with an account of its geologic history and a sketch of its water supplies. The illustrations consist of maps, cross sections, and half-tone views.

Bulletin 353. Geology of the Taylorsville region, California, by J. S. Diller. 218 pp., 5 pls., 12 text figures.

Detailed descriptions of the topography and geology of the region, with a sketch of its geologic history and an account of the development of its mineral resources. Contains topographic and geologic maps and other illustrations.

Bulletin 354. The chief commercial granites of Massachusetts, New Hampshire, and Rhode Island, by T. Nelson Dale. 228 pp., 9 pls., 27 text figures.

Detailed scientific and economic discussions of granite, including its origin, texture, and physical properties, and descriptions of the granites and quarries

of the three States mentioned, with a glossary of scientific and quarry terms and numerous illustrations. The second publication in a series on the granites of New England.

Bulletin 355. The magnesite deposits of California, by Frank L. Hess. 67 pp., 12 pls., 4 text figures.

A sketch of the occurrence of magnesite in this State, with a description of the deposits and statistics concerning the deposits in foreign countries. Half-tone illustrations show features of structure at different mines.

Bulletin 356. Geology of the Great Falls coal field, Montana, by C. A. Fisher. 85 pp., 12 pls., 2 text figures.

Designed mainly to furnish information regarding the character and extent of the coal resources of the region. Includes a description of the rock formations, indicating their character, distribution, structure, and stratigraphic relations, and a brief statement of mineral resources other than coal. The illustrations show sections of coal in various districts.

Bulletin 357. Preliminary report on the geology and oil resources of the Coalinga district, Fresno and Kings counties, Cal., by Ralph Arnold and Robert Anderson. 142 pp., 2 pls., 1 text figure.

A brief abstract of the report to be issued later as Bulletin 398, prepared to meet the urgent demand for early publication of available facts.

Bulletin 358. Geology of the Seward Peninsula tin deposits, Alaska, by Adolph Knopf. 71 pp., 9 pls., 7 text figures.

A presentation of the chief facts regarding the mineralogy and geology of the tin deposits of the peninsula, with an account of the developments and geologic and topographic maps.

Bulletin 359. Magnetite deposits of the Cornwall type in Pennsylvania, by Arthur C. Spencer. 102 pp., 20 pls., 21 text figures.

A sketch of the geology of eastern Pennsylvania, with a general description of the ore deposits in Berks and York counties and in the vicinity of Cornwall. Contains structure and cross sections of some of the mines and geologic maps.

Bulletin 361. Cenozoic mammal horizons of western North America, by H. F. Osborn, with faunal lists of Tertiary Mammalia of the West by W. D. Matthew. 138 pp., 3 pls., 15 text figures.

An outline of the geologic and climatic history of the Tertiary period in the West, a discussion of correlation, and a description, in order of age, of the horizons at which fossil mammals have been found and of the characteristics of the faunas occurring at these horizons.

Bulletin 362. Mine sampling and chemical analyses of coals tested at the United States fuel-testing plant, Norfolk, Va., in 1907, by John S. Burrows. 23 pp.

A report on the analyses of coals made on the grounds of the Jamestown Exposition.

Bulletin 363. Comparative tests of run-of-mine and briquetted coal on locomotives, including torpedo-boat tests and some foreign specifications for briquetted fuel, by W. F. M. Goss. 57 pp., 4 pls., 35 text figures.

A report on tests of coal and briquets at a railroad testing plant, in locomotives on the road, and on a torpedo boat, with notes on the briquet industry.

Bulletin 364. Geology and mineral resources of Laramie Basin, Wyoming: a preliminary report by N. H. Darton and C. E. Siebenthal. 81 pp., 8 pls., 1 text figure.

A sketch of the geography and geology of the basin and a description of its mineral resources. Contains a geologic map, structure sections, and views showing characteristic features of the topography and rock outcrops.

Bulletin 365. The fractionation of crude petroleum by capillary diffusion, by J. E. Gilpin and M. P. Cram, under the supervision of D. T. Day. 33 pp., 3 text figures.

A report on experiments in which crude petroleum was allowed to diffuse upward through tubes packed tightly with fuller's earth.

Bulletin 366. Tests of coal and briquets as fuel for house-heating boilers, by D. T. Randall. 44 pp., 3 pls., 2 text figures.

An account of tests of raw and washed coal and of briquets in three boilers of a size commonly used in residences, with deductions from the results obtained.

Bulletin 367. The significance of drafts in steam-boiler practice, by W. T. Ray and Henry Kreisinger. 61 pp., 26 text figures.

A theoretical discussion, based on experiments at the Survey testing plants and tests on a railway locomotive, with numerous diagrams.

Bulletin 368. Washing and coking tests of coal at the fuel-testing plant, Denver, Colo., July 1, 1907, to June 30, 1908, by A. W. Belden, G. R. Delamater, and J. W. Groves. 54 pp., 2 pls., 3 text figures.

Details of the tests, with chemical analyses of the coals used, both before and after testing.

Bulletin 369. The prevention of mine explosions, report and recommendations, by Victor Watteyne, inspector-general of mines, Belgium; Carl Meissner, councillor for mines, Germany; and Arthur Desborough, H. M. inspector of explosives, England, with letter of transmittal by James Rudolph Garfield, Secretary of the Interior. 11 pp.

A report made at the request of the Secretary of the Interior by three mining experts from Belgium, Germany, and England.

Bulletin 370. The fire-resistive properties of various building materials, by Richard L. Humphrey. 99 pp., 39 pls., 32 text figures.

Results of tests of 30 panels to determine the effect of fire and subsequent quenching with water. Contains numerous reproductions of photographs showing the condition of the panels before and after testing, diagrams showing temperature conditions, and tables giving results of compression tests on fragments remaining after fire tests.

Bulletin 371. Reconnaissance of the Book Cliffs coal field between Grand River, Colorado, and Sunnyside, Utah, by G. B. Richardson. 54 pp., 10 pls., 1 text figure.

An account of the topography, climate, and geology of the area and a description of its coal resources, including statements as to occurrence, amount, and character of the coal and notes on the mining development. Contains a geologic map, numerous sections, and views of typical geologic and other features.

Bulletin 372. Bibliography of North American geology for 1906 and 1907, with subject index, by F. B. Weeks and J. M. Nickles. 317 pp.

A bibliography, arranged by authors, of publications relating to North American geology, with descriptive notes, and an index by subjects, with special lists of chemical analyses, geologic formations, rocks, and minerals.

Bulletin 373. The smokeless combustion of coal in boiler plants, with a chapter on central-heating plants, by D. T. Randall and H. W. Weeks. 188 pp., 40 text figures.

A report of an investigation at nearly 500 industrial plants in 13 cities, the data from 284 plants being incorporated in the tables. Contains descriptions of representative boiler plants that burn coal practically without smoke, including plants with mechanical stokers and plants with hand-fired furnaces, illustrated by many diagrams of boiler and stoker settings; notes on smoke observations at Survey testing plants; and details of operations at 57 central heating plants. Concludes that smoke prevention is both possible and economical.

Bulletin 374. Mineral resources of the Kotsina-Chitina region, Alaska, by F. H. Moffit and A. G. Maddren. 103 pp., 10 pls., 9 text figures.

An account of the general geology, with illustrations showing characteristic rock outcrops, is followed by a detailed description of the mineral resources, chiefly copper but including a few gold placers. Contains two large geologic and topographic maps of the region.

Bulletin 375. The Fortymile quadrangle, Yukon-Tanana region, Alaska, by L. M. Prindle. 52 pp., 5 pls., 2 text figures.

Sketches of the geography and geology of the quadrangle, with reconnaissance maps, and description of the gold placers.

Bulletin 376. Peat deposits of Maine, by E. S. Bastin and C. A. Davis, prepared in cooperation with the Maine State Survey Commission. 127 pp., 3 pls., 20 text figures.

A general discussion of the nature, origin, conditions of growth, and uses of peat and methods of preparing it for domestic and commercial purposes, followed by detailed descriptions, arranged by counties, of Maine peat bogs, analyses of many Maine peats, and a short bibliography.

Bulletin 378. Results of purchasing coal under government specifications, by J. S. Burrows, with a paper on burning the small sizes of anthracite for heating and power purposes, by D. T. Randall. 44 pp.

An outline of the results accomplished by establishing specifications to govern the purchase of coal on the basis of its heating value. The paper on small anthracite is based on an investigation as to the coals most suitable for use in government buildings.

Bulletin 379. Mineral resources of Alaska; report on progress of investigations in 1908, by A. H. Brooks and others. 418 pp., 10 pls., 21 text figures.

The administrative report by A. H. Brooks is followed by the papers named below:

The mining industry in 1908, by Alfred H. Brooks.

The possible use of peat fuel in Alaska, by C. A. Davis.

Mining in southeastern Alaska, by C. W. Wright.

Copper mining and prospecting on Prince William Sound, by U. S. Grant and D. F. Higgins, jr.

Gold on Prince William Sound, by U. S. Grant.

Notes on geology and mineral prospects in the vicinity of Seward, Kenai Peninsula, by U. S. Grant.

Mineral resources of southwestern Alaska, by W. W. Atwood.

Mining in the Kotsina, Chitina, Chistochina, and Valdez Creek regions, by F. H. Moffit.

Mineral resources of the Nabesna-White River district, by F. H. Moffit and Adolph Knopf.

The Fairbanks gold-placer region, by L. M. Prindle and F. J. Katz.

Water supply of the Yukon-Tanana region, 1907–8, by C. C. Covert and C. E. Ellsworth.

Gold placers of the Ruby Creek district, by A. G. Maddren.

Placers of the Gold Hill district, by A. G. Maddren.

Gold placers of the Innoko district, by A. G. Maddren.

Recent developments in southern Seward Peninsula, by P. S. Smith.

The Iron Creek region, by P. S. Smith.

Mining in the Fairhaven precinct, by F. F. Henshaw.

Water-supply investigations in Seward Peninsula in 1908, by F. F. Henshaw.

Bulletin 385. Briquetting tests at the United States fuel-testing plant, Norfolk, Va., 1907–8, by Charles L. Wright. 41 pp., 9 pls.

Details of manufacture and various tests of the briquets which were used in the combustion tests reported in Bulletin 363, with a bibliography of Survey publications and other recent literature on briquetting.

Water-Supply Paper 219. Ground waters and irrigation enterprises in the foothill belt of southern California, by W. C. Mendenhall. 180 pp., 9 pls., 16 text figures.

A sketch of the geography and physiography, a record of the distribution and amount of rainfall, suggestions concerning the conservation of waters, a description of the ground-water districts with measurements of water levels in the wells, and an account of the various irrigation enterprises which have sprung up in the region. The illustrations include maps showing irrigated lands and artesian areas and sections of wells.

Water-Supply Paper 220. Geology and water resources of a portion of south-central Oregon, by Gerald A. Waring. 86 pp., 10 pls., 1 text figure.

A discussion of the present water resources and the development of a greater supply, a statement of the agricultural possibilities, and a summary of the data collected concerning the geology, with reconnaissance topographic and geologic maps of the region and other illustrations.

Water-Supply Paper 221. Geology and water resources of the Great Falls region, Montana, by Cassius A. Fisher. 89 pp., 7 pls.

A description of the different geologic formations, with statements concerning their structure, general distribution, and water capacity, and an account of the surface waters, including their present and proposed uses for irrigation, water power, etc. Contains maps showing the geology and the water resources of the region and the area of irrigated land.

Water-Supply Paper 222. Preliminary report on the ground waters of San Joaquin Valley, California, by Walter C. Mendenhall. 52 pp., 1 pl.

A brief outline of the water resources, chiefly underground, with notes on the supply by counties and suggestions as to future development in relation to agricultural products, accompanied by a map showing the artesian areas and ground-water levels.

Water-Supply Paper 223. Underground waters of southern Maine, by Frederick G. Clapp, with records of deep wells by W. S. Bayley. 268 pp., 24 pls., 4 text figures.

Descriptions of the general water resources, the dependence of quality and quantity on character of rocks, and the location and type of wells, including a

detailed discussion of the conditions in the various counties, with maps showing distribution of rocks and water and a table of deep wells.

Water-Supply Paper 224. Some desert watering places in southeastern California and southwestern Nevada, by Walter C. Mendenhall. 98 pp., 4 pls.

Notes on the topography of the region, especially as concerns the location of known watering places and the possibilities for finding and developing water at other favorable points, with descriptions of the main routes of travel and hints on desert traveling, accompanied by a map showing the location of the watering places described.

Water-Supply Paper 225. Ground waters of the Indio region, California, with a sketch of the Colorado Desert, by Walter C. Mendenhall. 56 pp., 12 pls., 5 text figures.

A geologic sketch of the district, an account of its water resources, and a brief history of its development, with a list of the producing wells. The illustrations include half-tone views of the region and a map showing wells, artesian areas, and irrigated lands.

Water-Supply Paper 226. The pollution of streams by sulphite pulp waste—a study of possible remedies, by Earle B. Phelps. 37 pp., 1 pl.

A discussion of the injurious effects of sulphite pulp waste on streams and of possible methods of purifying it and of making use of its valuable contents, with a description of the manufacture of wood pulp and a diagram illustrating the various steps in the process.

Water-Supply Paper 228. Water-supply investigations in the Yukon-Tanana region, Alaska, 1907 and 1908. Fairbanks, Circle, and Rampart districts, by C. C. Covert and C. E. Ellsworth. 108 pp., 7 pls.

An account of the stream-measurement work and the establishment of gaging stations, with an explanation of the methods of carrying on the work and collecting the data and tables showing the daily gage height and estimated discharge of the various streams. Contains maps and other illustrations showing the hydraulic development of the region.

Water-Supply Paper 229. The disinfection of sewage and sewage-filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 91 pp., 1 pl.

A discussion of the necessity for sewage purification, with an account of the methods and costs of disinfection, experimental investigations, and practical applications. Contains disinfection and relative stability tables.

Water-Supply Paper 230. Surface-water supply of Nebraska, by J. C. Stevens. 251 pp., 6 pls., 5 text figures.

A report of stream measurements in Nebraska to the end of 1908, with descriptions of the several drainage basins and tables showing the daily gage height and discharge of the streams. Contains illustrations typical of the rivers of the State.

Water-Supply Paper 231. Geology and water resources of the Harney Basin region, Oregon, by G. A. Waring. 93 pp., 5 pls.

A sketch of the topography, geology, and physiography of the district and of the sources and distribution of both surface and underground water, with suggestions as to conservation of the water supply and details of the several basins. Contains geologic and topographic maps of the region and other illustrations.

Mineral resources of the United States, calendar year 1907. Part I. Metallic products, 743 pp., 1 pl., 1 text figure. Part II, Nonmetallic products, 897 pp., 1 pl., 6 text figures.

Statistics of production of mineral substances in the United States, including an account of the chief features of mining progress, and comparisons of past and present conditions. This report is a consolidation of 50 separate chapters, each treating of a separate mining industry, published in pamphlet form in advance of the publication of the volume.

Advance chapters from "Mineral resources of the United States, calendar year 1908" as follows: The production of monazite and zircon in 1908, by Douglas B. Sterrett, 6 pp. The production of salt and bromine in 1908, by W. C. Phalen, 18 pp. The production of bauxite and aluminum in 1908, by W. C. Phalen, 14 pp. The production of phosphate rock in 1908, by F. B. Van Horn, 16 pp. The production of slate in 1908, by A. T. Coons, with general note on the classification and characteristics of slate, by T. Nelson Dale, 15 pp. The production of mica in 1908, by Douglas B. Sterrett, 14 pp.

Statistics of production of the minerals, chief features of mining progress, and comparisons of past and present conditions as in previously published reports.

Geologic folio 160. Description of the Accident and Grantsville quadrangles, comprising 460 square miles, of which the greater part is in the northwest corner of Maryland, but including also portions of Fayette and Somerset counties, Pa., and Preston County, W. Va. Prepared under the supervision of William Bullock Clark, state geologist of Maryland, by G. C. Martin. 14 folio pages of text, 6 maps, 2 structure sections, and 2 columnar sections.

Geologic folio 161. Description of the Franklin Furnace quadrangle, comprising an area of about 225 square miles in northwestern New Jersey, by A. C. Spencer, H. B. Kümmel, J. E. Wolff, R. D. Salisbury, and Charles Palache. Surveyed in cooperation with the State of New Jersey. 27 folio pages of text, 5 maps, and 1 structure-section sheet.

Geologic folio 162. Description of the Philadelphia district, an area 915 square miles in extent, consisting of four quadrangles—the Germantown, Norristown, Philadelphia, and Chester. The district lies in three States—Pennsylvania, New Jersey, and Delaware. Surveyed in cooperation with the State of New Jersey. The description is by F. Bascom, W. B. Clark, N. H. Darton, H. B. Kümmel, R. D. Salisbury, B. L. Miller, and G. N. Knapp. 23 folio pages of text, 8 maps, 2 structure sections, 2 columnar sections, and 1 sheet of illustrations exhibiting geologic features.

Geologic folio 163. Description of the Santa Cruz quadrangle, embracing a land area of 712 square miles in west-central California and a water area of 332 square miles in the adjoining part of the Pacific Ocean, by J. C. Branner, J. F. Newsom, and Ralph Arnold. 11 folio pages of text, 3 maps, 1 structure-section sheet, 1 columnar-section sheet, 1 page of illustrations exhibiting geologic features, and 1 page showing fossils found in the quadrangle.

Geologic folio 164. Description of the Belle Fourche quadrangle, an area 849 square miles in extent in northwestern South Dakota, by N. H. Darton and C. C. O'Harra. 9 folio pages of text, 4 maps, 1 structure section, and 1 columnar section.

Geologic folio 165. Description of the Aberdeen-Redfield district, which includes the Northville, Aberdeen, Redfield, and Byron quadrangles, covering 1,692 square miles near the central part of South Dakota, by J. E. Todd. 13 folio pages of text and 12 maps.

Geologic folio 166. Description of the El Paso quadrangle, comprising 894 square miles in the northwestern corner of that part of Texas which lies west of Pecos River, by G. B. Richardson. 11 folio pages of text, 2 maps, and 1 sheet of illustrations showing geologic features.

NOTE.—Folios 164, 165, and 166 are published also in octavo form for field use.

FIELD WORK BY THE DIRECTOR.

During the field season of 1908 the Director visited geologic parties in Wyoming, Montana, and New Mexico and topographic parties in Mississippi. He also had field conferences with the administrative officers of the Survey, geologists, engineers, and cooperating state officials. He attended the irrigation congress at Albuquerque, the mining congress at Pittsburg, and meetings of the West Virginia Coal Miners' Association at Charleston, W. Va., of the Illinois Coal Conference at Urbana, and of the Geological Society of America at Baltimore.

GEOLOGIC BRANCH.

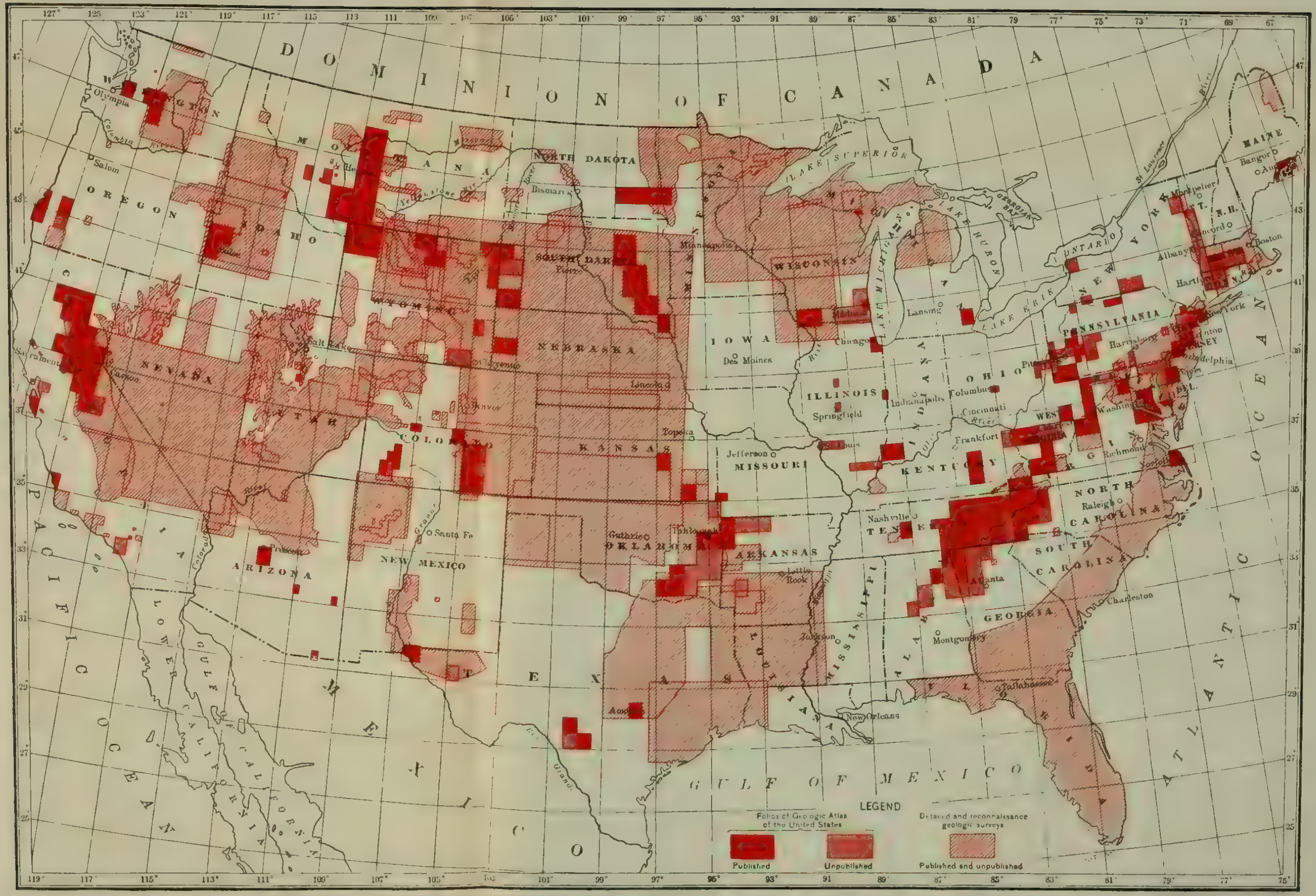
ADMINISTRATION.

The geologic branch consists of four divisions, each in charge of an administrative chief, viz, (1) geology and paleontology, C. W. Hayes in charge; (2) Alaskan mineral resources, A. H. Brooks in charge; (3) mineral resources, E. W. Parker in charge; and (4) chemical and physical research, G. F. Becker in charge.

General supervision of the work of the geologic branch is exercised by the chief geologist, C. W. Hayes, with a view to securing proper cooperation between the several divisions and coordination of the several lines of work. It is often to the advantage of the Survey to employ the members of one division in the work of another and the form of organization facilitates such transfers when exigencies demand it. The cooperation between the divisions of geology and mineral resources is especially close, and a large proportion of the annual volume issued by the latter division is prepared by members of the division of geology who are detailed for this work during a part of each year.

PUBLICATIONS.

The publications of the year prepared in the geologic branch included 7 geologic folios, 5 professional papers, 25 bulletins, and the annual volume on mineral resources. Besides these a large number of papers were, with the permission of the Director, published in scientific journals and in the transactions of scientific societies, and some original matter obtained incidentally during the course of the



MAP OF UNITED STATES, SHOWING AREAS COVERED BY GEOLOGIC SURVEYS

Scale
100 0 100 200 300 miles

1909

work and not appropriate for official reports has also been made the subject of unofficial publications. Such publications are ordinarily restatements of results in a more technical form and are usually prepared by members of the Survey without compensation.

The progress of geologic mapping during the year, as represented in the publications of the Survey, is shown on Plate I.

DIVISION OF GEOLOGY AND PALEONTOLOGY.

PERSONNEL AND ORGANIZATION.

The scientific force at the beginning of the year consisted of 51 geologists and paleontologists, 48 assistant geologists, and 31 junior geologists. During the year there were 13 resignations and 13 appointments. Of the total number on the rolls, 86 were continuously employed, 27 gave only a portion of their time to Survey work, and 17 were not employed during the year. In addition to the above regular force, 45 temporary field assistants were employed for a portion of the year.

For purposes of scientific supervision, to which in some cases is added direct administrative control, the work of the division is organized under a number of sections, viz:

Areal and structural geology, Arthur Keith in charge.
Paleontology and stratigraphic geology, T. W. Stanton in charge.
Economic geology, metalliferous ores, Waldemar Lindgren in charge.
Economic geology, fuels, M. R. Campbell in charge.
Land classification, A. C. Veatch in charge.

The functions of the section chiefs include the preparation of plans and supervision of field and office work as well as review and revision of results. They are directly responsible for keeping the Survey work up to a high scientific standard.

FIELD WORK BY THE CHIEF GEOLOGIST.

During July, 1908, the chief geologist visited field parties in Arkansas, Oklahoma, and New Mexico. He also made an examination of the geologic conditions at the site of the proposed Elephant Butte dam, at the request of the Reclamation Service. In October he visited a party in Tennessee and made a brief examination of geologic conditions in the Louisiana oil fields where work was in progress in cooperation with the State Survey. In November he visited a number of State geologists and mining engineers in different parts of the country in connection with the preparation of estimates of iron-ore reserves of the United States. In March and April he visited the principal oil fields of Mexico for the purpose of obtaining information of value in planning and directing work in the oil fields of the United States. In June he visited the oil fields of Oklahoma in connection with work there in progress.

GEOLOGIC WORK IN EASTERN AND SOUTHEASTERN STATES.

New England.—In Maine cooperative geologic work was continued under the supervision of E. S. Bastin. The mapping of the Eastport quadrangle was conducted by Mr. Bastin, assisted by C. L. Breger, the paleontologic studies being made by H. S. Williams. The preparation of this folio was well advanced.

Some additional work was done in the Frenchmans Bay quadrangle by C. W. Brown.

A report on the peat deposits of Maine (Bulletin 376) was completed by E. S. Bastin in cooperation with C. A. Davis, of the technologic branch, and considerable progress was made on a report on the pegmatites of Maine by Mr. Bastin.

The report on the fauna of the Chapman sandstone of Maine was nearly completed by H. S. Williams.

The inspection of the granite quarries of Connecticut was completed by T. N. Dale, and his report thereon is nearly finished. Mr. Dale also made considerable progress on the Mettawee, Fort Ticonderoga, and Fort Ann folios. In the spring he was transferred temporarily to the technologic branch, for the purpose of inspecting materials for eight government buildings in Massachusetts, Connecticut, and Rhode Island.

The text to accompany the general map of Massachusetts and Rhode Island, which has been prepared on a scale of 4 miles to the inch, was completed by B. K. Emerson. A preliminary map of the Keene (N. H.) and Warwick (Mass.) quadrangles was also prepared by Professor Emerson, and the maps and text covering the eastern half of the Housatonic quadrangle were completed and submitted for publication.

The survey of the surficial geology of the Taconic quadrangle, in Massachusetts, was substantially completed by F. B. Taylor.

In Vermont a field study of the stratigraphy and structure of the north end of the Taconic Mountains and adjacent areas was made by Arthur Keith, E. O. Ulrich, and T. N. Dale. Reconnaissances were also made by Mr. Keith in the Burlington, Middleburg, and Rutland quadrangles, particularly with reference to the structure of the Green Mountains. In these reconnaissances special consideration was given to the Ordovician and Cambrian limestones.

Considerable time has been devoted by Arthur Keith and others to general studies of the geology of Massachusetts and Vermont, with special reference to correlating the work of the different geologists in the New England field. This work will be supplemented during the coming year.

Atlantic and Gulf coastal plains.—In cooperation with the various state geological surveys, the studies of the Atlantic and Gulf coastal plains were continued throughout the year. W. B. Clark was in

charge of the investigations in the northern part of the area and T. W. Vaughan in charge of those in the southern part of the area. In addition to office supervision, Messrs. Clark and Vaughan from time to time made visits to various districts for the purpose of studying some special features, with the view of correlating so far as possible the work in the different States. Under their direction a general survey of the geology and underground waters of the coastal plain of Virginia has been made by B. L. Miller, E. W. Berry, and Samuel Sanford. A similar survey of the coastal plain of North Carolina has been made by B. L. Miller and L. W. Stephenson. Special reports on these surveys are practically completed. They will be published as bulletins of the North Carolina and Virginia state geological surveys.

The greater part of the field work for the report on the coastal plain of Georgia has been completed, by L. W. Stephenson on behalf of the Federal Survey and by Otto Veatch on behalf of the Georgia Geological Survey. The report on the stratigraphy and underground waters of Florida, by G. C. Matson and Samuel Sanford, has been completed and submitted. It will be published as a bulletin of the Florida Geological Survey. The data accumulated in regard to the stratigraphy and underground waters of South Carolina will be utilized in a report, now in preparation, by the state geologist, Earl Sloan.

In addition to the general surveys above mentioned, the detailed survey of the Choptank quadrangle in Maryland was completed by B. L. Miller and H. P. Little, and the report is now in preparation. Considerable progress was also made in the detailed survey of the Tolchester quadrangle in Maryland and of the Elkton and Wilmington quadrangles in Delaware and Maryland.

A report on the geology of Long Island was completed and submitted by M. L. Fuller. A special study of the Lower Cretaceous formations of Delaware and Maryland was made by Arthur Bibbins, E. W. Berry, and H. P. Little.

In the study of the fossils, which play an important part in deciphering the stratigraphy of the Coastal Plain, valuable assistance has been rendered by Miss Julia A. Gardner, of Johns Hopkins University, and Dr. R. S. Lull, of Yale University.

Along the Gulf coast the work has included the preparation of a report in cooperation with the State on the geology of the Caddo oil fields of northwestern Louisiana, by G. D. Harris, state geologist, and a report on the geology and underground waters of the coastal plain of Texas east of Brazos River and south of Jefferson, by Alexander Deussen. This study is now being extended to the region of Brazos River.

Northern Appalachian region.—The Ordovician rocks on the west flank of the Adirondack uplift were studied by E. O. Ulrich, in association with H. P. Cushing and Rudolph Ruedeman, of the New York State Survey, and H. M. Ami, of the Canadian Survey. Instructive sections of the Ordovician in Rensselaer County, N. Y., were also studied by Mr. Ulrich and Doctor Ruedeman. One of the results was the acquirement of important data bearing on the stratigraphic relations of the horizons containing graptolite faunas.

Geologic mapping in Pennsylvania was conducted in cooperation with the State, which made an appropriation of $4,500 for the purpose. The work was in charge of G. H. Ashley, who was assisted by Charles Butts, M. J. Munn, E. W. Shaw, W. C. Phalen, and E. F. Lines.

A progress report reviewing the geology of all the quadrangles studied by this Survey in cooperation with the State was prepared by Mr. Ashley, assisted by Messrs. Butts, Munn, and R. W. Stone. This report has been published as a bulletin of the State Survey.

The areal and economic survey of the Hollidaysburg quadrangle, Pennsylvania, was finished by Charles Butts, and the resulting maps and folio text were carried nearly to completion. Mr. Butts also spent several weeks in the Barnesboro and Patton quadrangles studying recent mining developments and ascertaining their bearing on obscure geologic features in that region.

The survey of the Foxburg quadrangle was completed by E. W. Shaw, and the maps and text for the Foxburg-Clarion folio were prepared for publication. The survey of the Burgettstown quadrangle was also carried to completion by Mr. Shaw, and the text of a folio on the Burgettstown and Carnegie quadrangles was practically finished.

The preparation of the Johnstown folio, by W. C. Phalen, was completed. Mr. Phalen also prepared a special economic report on the mineral resources of this quadrangle.

The survey of the Sewickley quadrangle, by M. J. Munn, was finished, and the texts for a folio and an economic bulletin on that quadrangle were submitted. A bulletin on the economic resources of the Carnegie and Clarion quadrangles was also completed by Mr. Munn. The economic bulletins on the Sewickley and Clarion quadrangles will be published by the State.

The text for the Claysville folio is nearly finished, and work has been started in the Pittsburg, New Kensington, and Freeport quadrangles.

An investigation of the mineral-paint ores of eastern Pennsylvania was made by B. L. Miller and E. F. Burchard, assisted by four senior students of the Lehigh University. An abstract of the results of this work will be found in the report on the production of mineral

paints in 1908. A more detailed report, which is now completed, will be included in the next annual economic bulletin.

The survey of the Gettysburg quadrangle was completed by G. W. Stose. The results of the survey of this quadrangle will be combined with those for the adjoining Fairfield quadrangle, to be surveyed during the present season, as a single folio.

The maps and text for the Pawpaw-Hancock (W. Va.-Md.-Pa.) folio were nearly completed by Mr. Stose, and that folio will soon be ready for publication.

Progress was made in the areal and economic survey of the Phoenixville and Honeybrook quadrangles, Pennsylvania, by Florence Bascom. This survey will be combined with that of the Reading and Boyertown quadrangles to furnish the material for one folio of the geologic atlas.

The survey of the crystalline formations of the Wilmington, West Chester, Coatesville, and Elkton quadrangles, covering parts of Pennsylvania, New Jersey, and Delaware, was completed by Miss Bascom.

Paleobotanic and stratigraphic studies were made by David White in the coal fields of the Beaver Falls quadrangle, Pennsylvania, and in the Short Mountain Pocono region of West Virginia. Preliminary reports embodying the results were submitted to the geologists in charge of the mapping.

The field survey of that portion of the Easton quadrangle, Pennsylvania, which lies west of Delaware River was completed by W. S. Bayley.

In cooperation with the New Jersey Geological Survey, Professor Bayley made a special study of the magnetite iron ores of New Jersey. His report will be published as a bulletin of the State Survey.

Considerable progress was made by Professor Bayley in the preparation of his report on the crystalline rocks and the economic resources of the Highlands area in the Raritan quadrangle, New Jersey.

A reconnaissance survey of the iron ores of the Appalachian region in Virginia was made by E. C. Harder, whose report will be found in Bulletin 380.

Southern Appalachian region.—The study of the iron ores of the Birmingham district, Alabama, was completed during the year, and the report, by Charles Butts, E. F. Burchard, and E. C. Eckel, is now in press as Bulletin 400. The maps and text for the Birmingham folio were also practically completed by Mr. Butts.

The areal and economic survey of the Brookwood quadrangle, Alabama, was carried nearly to completion by Mr. Butts, and considerable progress was made in the preparation of the maps and folio text. These can not, however, be completed until the new topographic base map is finished.

In the Dalton quadrangle, Georgia, half of the metamorphic area was mapped by W. C. Phalen.

Special studies were made of the metamorphosed sedimentary formations in the Suwanee and Cartersville quadrangles of Georgia by Arthur Keith, and in the Kings Mountain and Gaffney quadrangles of North Carolina and South Carolina by Mr. Keith and D. B. Sterrett. The latter area is considered the key to the geology of the Piedmont Plateau of North Carolina and South Carolina.

A reconnaissance of that part of the Dahlonega gold belt in Georgia which lies in Cherokee County, to the southwest of Dahlonega, was made by H. D. McCaskey. This district contains a larger number of mines and prospects than any other in the State. In cooperation with the State Geological Survey a preliminary geologic map of this district has been prepared for publication in the state report.

A study of the Clinton iron-ore deposits in the Chattanooga district of Tennessee and Georgia was made by E. F. Burchard, and a brief report published in Bulletin 380.

The maps and manuscript for the Woodbury (Tenn.) folio have been nearly completed by E. O. Ulrich, but it has been decided to withhold publication until the study of the adjoining Murfreesboro quadrangle is finished, the geology of the two quadrangles being closely related.

GEOLOGIC WORK IN THE CENTRAL STATES EAST OF 97°.

Geologic investigations in Illinois were continued in cooperation with the State Geological Survey, F. W. DeWolf being in charge of the work for the Federal Survey. Areal and economic maps of the West Frankford and Herrin quadrangles were completed, and additional studies of the surficial geology of the Galatia quadrangle were made. A report on the economic resources of the St. Louis quadrangle (Ill.-Mo.) was completed and submitted by N. M. Fenneman. A similar report on the Belleville and Breese quadrangles is in an advanced state of preparation.

In addition to the detailed surveys, reconnaissance surveys were made with reference to the correlation of the "Coal Measures" formations and the preparation of a structural contour map of the State. David White participated in the stratigraphic studies and devoted considerable time to paleobotanic and stratigraphic studies in the coal fields of Illinois and Indiana, and to the preparation of reports thereon. About 2,000 drill and shaft records were collected and studied by Mr. DeWolf.

In cooperation with the State of Indiana, G. H. Ashley, assisted by E. F. Lines and J. A. Udden, reviewed the geology of the coal fields of that State, collecting records of hundreds of recent drillings and

visiting all areas of new development where the geology was in doubt. The report on this work has been published as a bulletin of the State.

Considerable progress was made in the study of the areal geology of the East Cincinnati and West Cincinnati quadrangles (Ohio-Ky.), which is being conducted under the supervision of E. O. Ulrich. The map of the Ordovician formations, chiefly by R. S. Bassler and J. M. Nickles, was completed. The delineation of the Pleistocene geology, which was assigned to N. M. Fenneman, is in progress.

The monograph on the Lake Superior region, a monumental work on which C. R. Van Hise and C. K. Leith, with the aid of various assistants, have been engaged for a long time, was brought to completion and transmitted for publication. This is an exhaustive study of one of the most complicated regions in the country, which is of special interest to both the scientific and the commercial world because of its intricate structure and its enormous deposits of iron and copper.

Detailed study and areal mapping of the glacial drift in Wisconsin were continued by W. C. Alden, chiefly in Sheboygan, Fond du Lac, Calumet, Manitowoc, Dodge, Washington, and Ozaukee counties and in parts of Columbia and Dane counties. This work was done under the supervision of T. C. Chamberlin. Considerable progress was made by Mr. Alden in the preparation of the report on the glacial geology of southeastern Wisconsin.

At the opening of the fiscal year Frank Leverett was in Europe—on a trip made at his own expense—for the purpose of making a comparison of the drift sheets there with those in North America. These studies were pursued in each of the large centers of glaciation, namely, Scandinavia, Great Britain, and the Alps, as well as in two small areas of glaciation, the Riesengebirge and the Black Forest of southern Germany. Much light was obtained on the variations in the amount of weathering and erosion displayed by the European drift sheets, which will be very helpful in interpreting the glacial history of America. A report on the principal results of these European studies has been prepared.

Considerable progress was made on the monograph on the Pleistocene of Indiana and Michigan, of which Mr. Leverett and F. B. Taylor are joint authors. This report now awaits the completion of the base maps, which are in course of preparation. During the year Mr. Taylor spent some time in a special study of the lake history and drift formations in the southwestern part of Ontario for the Canadian Geological Survey. This region has an important bearing on the glacial and lake history of America in general, and the studies have furnished data that will be of value in the completion of the monograph on the Pleistocene of Indiana and Michigan and

in other investigations which are in progress. In connection with work on this monograph, additional field studies were made of certain beaches and moraines related to Lake Maumee, in northwestern Ohio.

An investigation of the existing condition of the lead and zinc industry of the Mississippi Valley was made by C. E. Siebenthal, who spent a month in the various lead and zinc camps in that region.

A field review of the complicated stratigraphic and faunal relations of the Paleozoic rocks in the Ouachita uplift of Arkansas and eastern Oklahoma was made by C. W. Hayes, E. O. Ulrich, J. A. Taff, and A. H. Purdue, for the purpose of obtaining data for an improved classification of the rocks of that region. During this conference parts of the Caddo Gap quadrangle in Arkansas and of the Tuskahoma, Atoka, and Ardmore quadrangles in Oklahoma were visited. On its conclusion Mr. Taff, assisted by W. J. Reed, reviewed the stratigraphy and structure of the McAlester, Tuskahoma, and Windingstair quadrangles, Oklahoma, with reference to the completion of the folios of those areas. A survey of the Mid-Continent oil field in Oklahoma was then begun, and the examination of the Morris-Bald Hill district was completed. As a result of these investigations, Mr. Taff, assisted by Mr. Reed, submitted brief reports on the grahamite of southeastern Oklahoma (in Bulletin 380) and on the Madill oil pool in Oklahoma (in Bulletin 381). He also has in preparation a more detailed report on the oil resources of Oklahoma and folios descriptive of the McAlester, Tuskahoma, and Windingstair quadrangles. In addition considerable time was devoted by Mr. Taff to the classification of the coal lands of Utah and Colorado.

The mapping of the Caddo Gap and Harrison quadrangles, Arkansas, was completed by A. H. Purdue, assisted by H. D. Miser and R. D. Mesler, and progress has been made in the preparation of the folios.

A report on the fauna of the Moorefield shale of Arkansas was completed by G. H. Girty.

Considerable progress was made by G. D. Harris in the preparation of a report on the Caddo oil field in Arkansas, Louisiana, and Texas. This work is being done in cooperation with the State Survey.

GEOLOGIC WORK IN THE WESTERN PUBLIC-LAND STATES AND TERRITORIES.

Rocky Mountain region.—One of the tasks assigned to the geologic branch at the beginning of the last fiscal year was the examination, for the purpose of classification and valuation, of about 16,000 square miles of supposed coal territory in the Rocky Mountain region. This work was placed in charge of M. R. Campbell, with C. A. Fisher as chief assistant. In order to cover this territory properly twelve field parties were organized and three independent workers were sent

out. In addition there was undertaken, for the Bureau of Indian Affairs and in cooperation with the Reclamation Service, as provided in the act of May 30, 1908, an examination of the lignite beds of the Fort Peck Indian Reservation. For this investigation one large field party was organized and put in charge of C. D. Smith, making a total of thirteen field parties and three independent workers. During the winter the results of these field examinations were compiled in the office. This involved the preparation of geologic maps, of township plats showing the classification and valuation of the coal lands examined, and of preliminary reports on the geology of the regions. The following is a list of the areas examined and of the geologists in charge of the work:

Newcastle coal field, Wyoming. R. W. Stone.
Cambria coal field, Black Hills region, Wyoming. R. W. Stone.
Northwestern part of Great Divide coal basin, Wyoming. E. E. Smith.
Coal fields in southeastern part of Bighorn Basin, Wyoming. E. G. Woodruff.
Coal fields on north and east sides of Bighorn Mountains, Wyoming. H. S. Gale.
Coal fields in Wind River Basin, Wyoming. E. G. Woodruff.
Southeastern extension of the Hanna coal field, near Arlington, Wyo. M. W. Ball.
Southern part of Rock Springs coal field, Wyoming. A. R. Schultz.
Coal field in northern Wyoming which adjoins on the east the Sheridan coal field. R. W. Stone.
Eastern part of Little Snake River coal field, southern Wyoming. M. W. Ball.
Livingston coal field, Montana. W. R. Calvert.
Coal field in vicinity of Electric, Mont. W. R. Calvert.
Portion of Milk River coal field, northern Montana. L. J. Pepperberg.
North-central part of Bull Mountain coal field, Montana. R. W. Richards.
Fort Berthold Indian Reservation, N. Dak. (examination made for the Reclamation Service). C. D. Smith.
Vicinity of Washburn, N. Dak. (examination made for Reclamation Service). C. D. Smith.
Trinidad coal field, southern Colorado. G. B. Richardson.
Colorado Springs coal field, Colorado. M. I. Goldman and G. C. Martin.
Coal fields in vicinity of Canon City and South Park, Colo. C. W. Washburne.
Coal fields of north-central Colorado between Sedalia and the Wyoming state line. G. C. Martin.
Part of the Raton coal field east of the Maxwell land grant, in southern Colorado and northern New Mexico. W. T. Lee.
Several small coal fields in central New Mexico. J. H. Gardner.

In all the foregoing fields the special stratigraphic and paleontologic studies necessary for the correlation of the rocks of the different regions were made by T. W. Stanton and F. H. Knowlton.

At the request of the Bureau of Indian Affairs an examination of the Standing Rock and Cheyenne Indian reservations of North Da-

kota and South Dakota was undertaken April 1, 1909. This survey, which is provided for in the act of May 29, 1908 (35 Stat. L., 460–462), was placed in charge of W. R. Calvert. It will cover an area of 4,150 square miles, of which nearly one-half is supposed to be underlain by valuable lignite deposits. This investigation is still in progress. Three well-equipped field parties, under the personal direction of V. H. Barnett, A. L. Beekly, and M. A. Pishel, are engaged on the work.

In addition to the foregoing surveys, which were made for the purpose of classifying the lands with reference to their value as coal-producing territory, the following other surveys and investigations were carried on in the Rocky Mountain region during the last fiscal year:

The map and text for the Laramie-Sherman folio, Wyoming, were completed by N. H. Darton, C. E. Siebenthal, and Eliot Blackwelder, and submitted for publication.

A field study of the pre-Cambrian rocks of parts of British Columbia, Alberta, and Montana lying between the Crows Nest division of the Canadian Pacific Railway on the north and the main line of the Great Northern Railway on the south was made by C. D. Walcott, assisted by L. D. Burling. The object of this study, carried on chiefly at the expense of the Smithsonian Institution, was to ascertain the true relations of the rocks of that area to the pre-Cambrian rocks of central Montana and to the Cambrian rocks of the section along the main line of the Canadian Pacific Railway farther to the north.

The areal survey of the Philipsburg quadrangle, Montana, was completed by F. C. Calkins. Considerable progress was made in the preparation of the report, which will include a chapter on the ore deposits, by W. H. Emmons, who made a special study of that feature of the district. Mr. Emmons's report has been completed and submitted.

An areal survey of the Frisco (Utah) mining district was well advanced by B. S. Butler, under the supervision of Waldemar Lindgren, chief of the section of metalliferous deposits.

The report on the Park City mining district, Utah, is nearing completion. It has been delayed by the resignation, in September, 1908, of J. M. Boutwell, who had the matter in charge.

F. L. Hess spent a few weeks in a study of the tin, tantalum, and tungsten deposits of South Dakota. A brief report on these investigations will be found in Bulletin 380.

An examination of deposits of mica in South Dakota was made by D. B. Sterrett, and a brief report thereon prepared for Bulletin 380.

A study of the phosphate deposits of Idaho and Wyoming was begun in June by H. S. Gale, assisted by R. W. Richards and C. E.

Breger. The object of this work is the classification of land temporarily withdrawn from entry on account of its phosphate deposits. The report of G. H. Girty on the fauna of the Carboniferous phosphate beds of Utah, Idaho, and Wyoming, based on collections made in previous years, has been completed.

Progress was made in the preparation of a supplementary report on the complicated geology of the Leadville district, Colorado, by S. F. Emmons and J. D. Irving.

The study of the Breckenridge (Colo.) mining district was started during the fall by F. L. Ransome and will be continued during the present season.

An examination of the mining districts of eastern Gunnison County, Colo., was made by J. M. Hill. A brief report will be found in Bulletin 380.

Geologic mapping in the San Juan region of Colorado was continued by Whitman Cross, assisted by H. Bancroft and J. P. Iddings. During the season field work in the Lake City quadrangle was completed and the northern portion of the San Cristobal quadrangle was surveyed. The revision of the map and text for the Engineer Mountain folio, made necessary by the study of adjacent areas, was finished and the folio is now in process of publication. The reports on the Lake City and San Cristobal quadrangles await the completion of field work in adjoining districts. A bulletin on the ore deposits of the Lake City quadrangle is, however, well advanced.

A study of the Florence oil field, Colorado, was made by C. W. Washburne. A brief report on the investigation will be found in Bulletin 381.

A report on the metalliferous deposits of New Mexico was completed by Waldemar Lindgren.

An examination of the magnetite deposits of Hanover, N. Mex., was made by Sidney Paige, and a map of the area in which the principal mines are located was prepared. A report on this examination appears in Bulletin 380.

During the early part of the fiscal year a report on the mining districts of Mohave County, Ariz., was completed by F. C. Schrader and is in press as Bulletin 397. In March Mr. Schrader began an investigation of the mineral deposits of the Patagonia and Nogales quadrangles, Arizona, in which he was assisted by J. M. Hill.

A reconnaissance of the geology and mineral deposits in the northern part of Yuma County, Ariz., was made by H. Bancroft.

The Whetstone Mountains, south of Benson, Ariz., were visited by F. L. Hess, for the purpose of studying the tungsten deposits. A brief report on these deposits will be found in Bulletin 380.

At the request of the Supervising Architect of the Treasury Department, an investigation of the marble prospects near Bowie, Ariz.,

was made, with reference to the geologic conditions which might affect the availability of these marbles for building or decorative purposes. This work was in charge of Sidney Paige, whose report has been submitted.

Geologic mapping in central Texas was placed in charge of A. C. Spencer. The detailed mapping of the complicated pre-Cambrian area of the Llano 30-minute quadrangle was completed and considerable progress was made in the study of the crystalline rocks of the adjoining Burnet quadrangle. In connection with this mapping a careful study has been made of the metallic iron ores of the district. In this work Mr. Spencer has been assisted by Sidney Paige, and during a part of the time by H. Bancroft and F. H. Kay. A brief visit to the region was also made by E. O. Ulrich, for the purpose of assisting in the differentiation of the Paleozoic formations.

In cooperation with the technologic branch David White devoted considerable time to studies of the western coal fields and to collecting material bearing on the origin of certain coals.

Pacific coast.—The field study of the geology and ore deposits of the Goldfield (Nev.) district was completed by F. L. Ransome in July. His detailed report, which was prepared during the winter, is now ready for distribution (Professional Paper 66).

A reconnaissance of the mining regions between parallels 40° and 41° and meridians 117° and 119° was made by Mr. Ransome. This reconnaissance resulted in the preparation of several short reports on the geology and mineral resources of various areas in Nevada. These reports cover the Bullfrog (Bulletin 407); Yerington, Hornsilver, and Round Mountain (Bulletin 380); and Humboldt County (Bulletin 414) districts. In the field work on the Bullfrog district Mr. Ransome was assisted by W. H. Emmons and G. H. Garrey.

A reconnaissance of the mining districts in northeastern Nevada between meridians 116° and 117° and parallels 40° and 42° was made by W. H. Emmons, whose report is nearly ready for publication (Bulletin 408).

A brief examination of the platinum deposits in southern Nevada was made by H. Bancroft, and a study of oil prospects in Nevada by Robert Anderson. Brief reports upon the oil prospects near Reno, in Mason and Smith valleys, and near Palisade were published in Bulletin 381.

Surveys in the oil region of southern California were in charge of Ralph Arnold, assisted by H. R. Johnson. These surveys included the McKittrick, Midway, Sunset, Temblor, Devils Den, and Carrizo Plain districts and adjacent parts of western Kern and eastern San Luis Obispo counties. Special attention was given to the details of the underground geology in the proved territory, in order to discover the laws governing the occurrence of the petroleum in the

various fields, and also to a study of the structure and stratigraphy of the adjacent region, with a view to furnishing information as to the extension of the productive area and to decreasing the cost of exploitation by reducing the number of dry holes drilled. A study of the paleontology, which bears a peculiarly important relation to the interpretation of the structure and stratigraphy in this region, was carried on simultaneously with the economic work. A preliminary report on the region has been completed and is in press as Bulletin 406.

The detailed report on the Coalinga oil district, California (Bulletin 398), was completed by Ralph Arnold, assisted by Robert Anderson. The paleontology of this district was made the subject of a special report (Bulletin 396) by Mr. Arnold. Both of these reports are now in press. During the year a report on the sodium sulphate deposits in the Carrizo Plain, by Ralph Arnold and H. R. Johnson, was issued as an advance chapter of Bulletin 380.

On the resignation of Mr. Arnold, June 1, 1909, Mr. Anderson was assigned to continue the investigations of the California oil fields, and field work in the Carrizo Plain region—an undeveloped territory adjoining the McKittrick-Sunset district—was resumed.

Geologic work in the Randsburg quadrangle, California, was prosecuted by F. L. Hess, who gave special attention to the study of the gold deposits of that area.

The report on the copper-mining districts in Shasta County, Cal., is nearing completion. It has been delayed by the resignation, in February, of L. C. Graton, who made the investigations and who had the matter in charge. The work has been taken up by B. S. Butler, and will be pushed to completion as soon as possible.

On June 1, 1909, a detailed study of the iron-ore deposits of southern California was commenced by E. C. Harder and J. L. Rich. This work will be continued during the summer and fall.

The Bohemia mining district of Oregon was examined by D. F. MacDonald, who spent two weeks in a study of the district and made a brief report thereon (in Bulletin 380).

Considerable progress was made by F. C. Calkins and J. T. Pardee in the areal mapping of the Sumpter quadrangle in Oregon. A brief report on the faulting and vein structure in the Cracker Creek mining district, in this quadrangle, was prepared by Mr. Pardee and appeared in Bulletin 380.

Satisfactory progress was made by J. P. Smith on the report on the Upper Triassic of California, Oregon, and Nevada. Field work bearing on this subject was confined to the Blue Mountains of Oregon.

A special reconnaissance of the Grants Pass quadrangle and bordering region in Oregon was made by J. S. Diller, assisted by G. F. Kay. A brief report will be found in Bulletin 380.

National forests.—An important work carried on by the geologic branch is the examination of contested mineral claims in the national forests. This work is under the immediate supervision of Waldemar Lindgren. To it there were detailed during the year a number of geologists as well as temporary assistants. Contested claims in the Cabinet and Black forests were examined and reported on by F. C. Schrader. Claims in the Holy Cross, La Salle, Gunnison, Jemes, Montezuma, Ozark, Pecos, Rio Grande, Taos, Teton, and Leadville forests were examined and reported on by J. M. Hill; claims in the Sawtooth and Snoqualmie forests by E. E. Bugbee; claims in the Rainier forest by E. E. Bugbee and J. B. Umpleby; claims in the Umpqua, Black Hills, and Crater forests by D. F. MacDonald; and claims in the Trinity and Plumas forests by H. W. Turner. In all 131 claims or groups of claims were examined, and reports as to their mineral or nonmineral character were transmitted to the Forest Service. Of the total number of locations examined 76 were recommended to be canceled as nonmineral land.

GENERAL GEOLOGIC AND PALEONTOLOGIC WORK.

T. W. Stanton has had general supervision of the paleontologic work during the year. In order to make this work of the highest possible service it is necessary to bring the paleontologists and geologists into close touch in the field. Hence most of the field work of the paleontologists is done in connection with geologic parties. The paleontologic work is essential not only in connection with stratigraphic, structural, and areal geology, but also with various problems of economic geology. This is notably true of the investigations of oil and coal fields, where the tracing of productive horizons and the correlation of beds from place to place would be impossible without the assistance of the expert paleontologist. In addition to the aid rendered in the field, a large share of the time of the paleontologists during the office season is occupied in the determination of fossil collections submitted by the field geologists. So fully is their time taken by this routine work that little opportunity remains for the general studies and correlations essential for the symmetrical development of the Survey work. Additional assistants in the section of paleontology are urgently needed.

In addition to the supervision of the paleontologic work, Mr. Stanton visited 17 parties in the field in Montana, Wyoming, and Colorado, chiefly engaged in the land-classification surveys, for the purpose of correlating the coal-bearing formations and of studying problems bearing on the late Cretaceous and early Tertiary rocks of the Rocky Mountain region. Field study on the same general problems was resumed by Mr. Stanton early in June.

The study of the stratigraphy and paleontology of the coal-bearing rocks of the Rocky Mountain region was continued in the field and

office by F. H. Knowlton, who visited numerous points in Montana, Wyoming, Colorado, and New Mexico, for the purpose of collecting fossil plants and determining the stratigraphy of the coal beds.

Under the joint direction of F. H. Knowlton and C. D. White a compendium of paleobotany is being prepared by Miss C. H. Schmidt, and satisfactory progress is reported.

W. H. Dall has continued during the year his studies on the Tertiary paleontology of the Pacific coast.

The work of the other paleontologists has been noted in connection with the geologic work with which it is intimately related.

Considerable progress was made on the monograph of Cambrian Brachiopoda by C. D. Walcott. The technical descriptions and most of the tables were completed. The chapters dealing with the classification, evolution, and biologic relations of the Brachiopoda were also completed.

A study of graptolite faunas, with special reference to their value in stratigraphic correlation, was made by E. O. Ulrich. This has been found of great service in the classification of shale and sandstone formations in which other classes of fossils are practically absent.

Progress was made on the monographs on Cambrian bivalved Crustacea and on fossil Ostracoda, which are in course of preparation by E. O. Ulrich and R. S. Bassler.

A special monographic study of the Mesozoic and Cenozoic Echinodermata of the United States is being made by W. B. Clark and M. W. Twitchell. In this work particular attention has been given to the geologic distribution of the forms, as an aid in the interpretation of the Cretaceous and Tertiary deposits of the Atlantic and Gulf coastal plains.

The collection of fossils from the celebrated "silex" beds of Florida was greatly augmented during the year. As they are of importance in correlating the Oligocene of the Antilles, a special study is being made of them by W. H. Dall. The results will later be incorporated in a bulletin.

The preparation of the general geologic map of North America, which is being compiled in cooperation with the geological surveys of Canada and Mexico, has been continued by Bailey Willis. The map and accompanying descriptive text are approaching completion. They will be published as a professional paper, entitled "Index to the stratigraphy of North America." In connection with this work studies in paleogeography were carried on, in the course of which fifteen maps of the continent have been drawn to represent its geographic aspect at as many periods, from Lower Cambrian to Quaternary.

During the prosecution of the coal-land surveys in the States of Montana, Wyoming, and Colorado, important stratigraphic data

bearing on the late Cretaceous and early Tertiary history of that region were obtained. From these data a general geologic map of the region has been prepared by Bailey Willis.

Studies of the Pleistocene glaciation of the Sierra Nevada were continued by W. D. Johnson, who, in company with G. K. Gilbert and with E. C. Andrews, of the New South Wales Department of Mines, made an excursion to the alpine district of the Sierra, where a joint field study of the mechanics of glacial erosion and the principles of glacial sculpture was conducted.

The catalogue of earthquakes in the United States, which is in charge of H. F. Reid, was during the year augmented by records of some early earthquakes, as well as records of earthquakes which occurred during the year.

A general report on the manganese deposits of the United States was prepared by E. C. Harder, and a bulletin on the economic geology of the feldspar deposits of the United States (Bulletin 420) was completed by E. S. Bastin.

Considerable progress was made in the classification of the physiographic features shown on topographic maps, a study which is being conducted by W. W. Atwood.

A comprehensive geologic exhibit was prepared for the Alaska-Yukon-Pacific Exposition at Seattle. The work of assembling and classifying the exhibit was in charge of J. S. Diller.

The important investigation of problems connected with the overloading of California rivers by mining débris was continued by G. K. Gilbert, in cooperation with the water-resources branch.

WORK OF LAND-CLASSIFICATION BOARD.

The organization of the land-classification board has already been discussed on pages 10–12. The work accomplished by the board to the close of the fiscal year has been as follows:

Coal land.—Soon after its organization the coal section of the board found that it was confronted with many questions which required a decision by the Secretary. The matter was therefore presented to him with the statement that, until he should rule on the questions presented, it was deemed unwise to transmit further classifications. New regulations covering the classification of coal land were approved by the Secretary on April 10, 1909, and classification was immediately resumed.

In these regulations the selling price of the government coal land is fixed on the basis of tonnage and quality of the coal, the rate ranging, except for lignite, from half a cent to 3 cents a ton, about 5 to 30 per cent of the royalties prevailing in the West. This low percentage is adopted in order to allow for the cost of carrying the investment while mining, as opposed to the royalty paid when the coal is

mined, and for the extra hazard of a coal-land purchase over that of a lease paying a royalty on coal actually recovered. These unit rates are further reduced where the land contains more than one bed, and these reductions, with allowances for depth and other factors, make the actual price fixed usually less than 10 per cent of royalty prices.

Since the adoption of these regulations 5,155,194 acres of land have been classified with respect to their coal values. Of this total area, 742,573 acres were classified as coal land, and the selling price fixed on this area is approximately $30,000,000, representing an advance over the minimum price fixed by law of more than $16,000,000. Of this land, over 50 per cent belongs to the Government, and if this coal land were leased it would ultimately yield about $150,000,000 instead of the $15,000,000 which will be received by sale.

The area classified is divided among the States as follows:

Coal-land classification under Secretary's regulations of April 10, 1909.

State.	Area in acres.		Total value of coal land at prices fixed.	Total value of coal land at minimum price.
	Coal.	Noncoal.		
Colorado	104,298	331,865	$2,325,330	$2,085,960
Montana	493,931	2,241,210	12,026,847	9,739,919
Wyoming	144,344	1,839,546	16,136,174	2,316,833
	742,573	4,412,621	30,488,351	14,142,712

All coal-land classifications heretofore made by the Geological Survey will be reviewed by the coal section and the lands reclassified.

The results obtained by the 13 parties now surveying the public coal lands will also come to the section for action.

In addition to the above, the coal section has classified 19 coal claims in national forests.

Phosphate.—On December 10, 1908, the Secretary, in aid of proposed legislation covering the disposal of phosphate lands, temporarily withdrew from all forms of disposal the unpatented lands in tracts covering 4,699,160 acres in the States of Wyoming, Idaho, and Utah. These withdrawals were made by the township unit, because of the uncertainty of the location of the phosphate-bearing beds with reference to the smaller legal subdivisions. A review of this withdrawal by the phosphate section of the board led to the restoration of 231,040 acres of nonphosphate lands in areas where the location of the deposits with reference to the land corners was known with sufficient definiteness to warrant such action. It is expected that examination will show that a large per cent of the land now withdrawn is nonphosphate, and the release of such areas will immediately follow the completion of the field work now in progress.

Power sites.—Upon data furnished by the Geological Survey, the Secretary, between May 4 and June 30, 1909, made 26 temporary

power-site withdrawals covering rivers in Colorado, Montana, Idaho, Oregon, Utah, and Wyoming. These withdrawals were made in aid of proposed legislation affecting disposal of power sites and resulted in the removal from all forms of disposal and temporary suspension of existing entries, claims, and filings in the following areas:

Power-site withdrawals.

[Acres.]

State.	Entered land.	Vacant land.	Total.
Colorado	360	21,880	22,240
Montana	6,066	39,979	46,045
Idaho	3,402	56,480	59,882
Oregon	5,849	75,269	81,118
Utah	15,200	19,680	34,880
Wyoming	7,754	27,629	35,383
	38,631	240,917	279,548

Other withdrawals are being made as rapidly as data becomes available.

Enlarged homestead designations.—The enlarged homestead act became a law on February 19, 1909, and the first designation under this law was made by Secretary Garfield in eastern Wyoming on March 3, 1909.

The total areas designated in each State up to the end of the fiscal year are given below:

Designations under enlarged homestead law.

	Acres.		Acres.
Wyoming	10,676,280	Oregon	8,346,560
Arizona	26,657,280	Utah	7,044,480
Colorado	20,299,840	Washington	3,576,960
Montana	19,957,960		
Nevada	49,512,960		160,880,840
New Mexico	14,808,520		

Since the passage of the enlarged homestead act 91 petitions have been received. The action taken on these is indicated below:

Enlarged homestead designations in March, April, May, and June, 1909.

Favorably considered	16
Partly refused	21
Refused	12
Pending:	
Field work in progress	16
Under consideration	26

Oil.—The oil section of the board classified 974,820 acres in the McKittrick-Sunset (California) oil withdrawal. Of this area 430,340 acres were classified as oil land.

DIVISION OF ALASKAN MINERAL RESOURCES.

The work of the division of Alaskan mineral resources was carried on under an appropriation of $80,000 for "continuation of the investigation of the mineral resources of Alaska," work of the following classes having been done: Reconnaissance and detailed geologic surveys; special investigations of mineral resources; reconnaissance and detailed topographic surveys; investigations of water resources in reference to supply available for placer mining; and collection of statistics on mineral production.

PERSONNEL.

The personnel of the division varies greatly during the year by transfers of technical employees to and from other divisions of the Survey and by the employment of temporary clerks as the work demands. Throughout the year 1 geologist in charge, 7 other geologists, 3 topographers, and 3 clerks have been employed. In addition to these 1 geologist was employed on annual salary until April 20, when he was transferred to the per diem force; 1 geologist on an annual salary gave about half his time to the Alaska work; and 3 others were employed a part of the time on a per diem compensation. On May 1, 1909, 1 additional geologist on annual salary and 1 topographer on monthly salary were added to the force by transfer from other divisions. Five engineers were detailed to the division from the water-resources branch for varying periods of time.

During the season of 1908 the field force included also 1 topographic and 1 geologic field assistant, together with about 28 teamsters, cooks, etc. The temporary assistants in the field force, as already organized for 1909, include 2 geologic and 2 topographic field assistants, with about 30 laborers. One temporary clerk has been employed in the office for six months and a clerical assistant for short periods of time. On June 30, 1909, the division included 1 geologist in charge, 9 geologists on annual salaries and 5 geologists employed at a per diem compensation, 2 geologic field assistants, 3 engineers, 30 camp hands, and 3 clerks.

FIELD OPERATIONS IN SEASON OF 1908.

Allotments and areas covered.—Thirteen parties were engaged in Alaskan surveys and investigations during the field season of 1908 for varying periods between March and November. Some of these parties were subdivided in the field, making a total of 17 parties that were engaged in various kinds of investigation. The geologist in charge also spent a part of the summer in Alaska, carrying on geologic investigations and visiting field parties.

The area covered by topographic reconnaissance surveys during 1908 aggregated 3,975 square miles; by detailed topographic surveys,

427 square miles; by detailed geologic surveys, 604 square miles; and by geologic reconnaissance surveys, 4,850 square miles. In addition to the actual areal mapping most of the geologists spent considerable time in studying special problems connected with the mineral deposits. The investigation of the water supply in placer districts covered an area of 6,700 square miles and included the maintenance of 53 gaging stations and 556 measurements of stream volumes. Of the 28 mining districts of Alaska that are being developed 18, including all but 3 of the most important, were visited by members of the staff. The following table shows the allotment of the appropriation to the different districts of Alaska. These figures include the cost of both field and office work as well as inspection.

Allotments to Alaskan surveys and investigations, 1908.

Southeastern Alaska	$9,800
Prince William Sound and southwestern Alaska	9,100
Copper River region	20,000
Yukon basin	27,950
Seward Peninsula	13,150
	80,000

The following table shows approximately the amount of money devoted to each class of investigation. It is not possible to give the exact figures, as in some cases the same party, or even the same man, carried on two different kinds of work; but this statement will help to elucidate the later table, which summarizes the complete areal surveys:

Approximate allotment of Alaskan funds to different classes of surveys and investigations, 1908.

Geologic reconnaissance surveys	$14,100
Detailed geologic surveys	10,000
Special geologic investigations	8,900
Topographic reconnaissance surveys	12,200
Detailed topographic surveys	14,200
Investigation of water resources	9,900
Collection of statistics of mineral production	1,500
Miscellaneous, including clerical salaries, administration, inspection, instruments, and office supplies and equipment	9,200
	80,000

The geologic reconnaissance surveys of the above table include all those published on a scale of 1:250,000 to 1:625,000, or approximately 4 to 10 miles to the inch. The detailed geologic surveys are for

publication on a scale of 1:62,500, or approximately 1 mile to the inch. The special geologic investigations are chiefly those directed to the study of problems connected with the occurrence of mineral deposits. The topographic reconnaissance surveys are chiefly for publication on a scale of 1:250,000, usually with 200-foot contours, though some exploratory surveys are published on a scale of 1:625,000. The detailed topographic surveys are for publication on a scale of 1:62,500, with 25, 50, or 100 foot contours. The water-resources investigations have for their purpose the determination of the water supply available for placer mining.

The cost per square mile of the various types of surveys is determined by many factors varying greatly in different parts of the Territory. Chief among these is the item of transportation, which ranges in cost from 5 to 30 per cent of the total expenditure for surveys. The cost of the topographic reconnaissance surveys is from $2 to $4 per square mile and of the detailed topographic mapping from $25 to $40 per square mile. The variations are partly due to differences in cost of transportation, but also to character of topography, vegetation, rainfall, length of open season, etc.

All the variations which affect the cost of topographic work also influence that of geologic mapping. In addition there is a more important factor in the knowledge of the characteristics of the geology and of the problems involved, before the work has been begun. If the general features of the geology of any province are known, areal mapping can be carried on much more rapidly there than in an unexplored province. Obviously, also, where the stratigraphic and areal relations are simple mapping can be carried on far more rapidly than where they are complex. It is not surprising, therefore, that the cost of geologic reconnaissance surveys varies from 75 cents to $3.50 per square mile. In Alaska detailed geologic surveys have been carried over only a few small areas, so that there are few data on which to base estimates of cost. The evidence in hand, however, indicates a cost of $14 to $34 per square mile for work of this class. Water-resources investigations, involving the measurement of stream volumes in the same district for a period of years, can not be estimated per square mile.

The following table shows the progress of Alaskan surveys since the beginning of systematic work in 1898:

Progress of surveys in Alaska, 1898–1908.[a]

Year.	Appropriation.	Areas covered (square miles).				Water-resources investigations.	
		Geologic.		Topographic.		Gaging stations maintained part of year.	Stream-volume measurements made.
		Reconnaissance.	Detailed.	Reconnaissance.	Detailed.		
1898	$46,189.60	9,500	.....	14,912	.....	.....	.....
1899	25,000.00	6,000	.....	8,688	.....	.....	.....
1900	25,000.00	10,000	.....	11,152	.....	.....	.....
1901	35,000.00	12,000	.....	15,664	.....	.....	.....
1902	60,000.00	17,000	.....	20,304	235	.....	.....
1903	60,000.00	13,000	336	15,008	.....	.....	.....
1904	60,000.00	6,000	.....	6,480	480	.....	.....
1905	80,000.00	8,000	550	8,176	948	.....	.....
1906	80,000.00	9,000	414	10,768	40	14	286
1907	80,000.00	4,000	400	6,125	501	48	457
1908	80,000.00	4,850	604	3,975	427	53	556
	631,189.60	99,350	2,304	121,252	2,732	.....	.....
Percentage of total area of Alaska	.....	16.94+	0.39+	20.85—	0.47—	.....	.....

[a] In addition to the above, the International Boundary Survey and the Coast and Geodetic Survey and other government bureaus have covered an area of approximately 50,000 square miles. Most of this work is along the coast line, and has been carried on with a high degree of refinement. The inland surveys are chiefly of a reconnaissance character, except for a narrow strip along the international boundary.

The progressive decrease in the area covered annually by reconnaissance surveys is largely due to the fact that since 1903 a considerable part of the appropriation has been spent for detailed surveys, in order to meet the growing demand for detailed maps. As the detailed surveys cost from five to twenty times as much as reconnaissance surveys, the total area surveyed for the same money is necessarily very much less. Another reason for the decrease is the fact that during the first five years practically the entire appropriation was devoted to explorations, whereas now much of it is spent on special investigations. Moreover, early exploratory surveys were not executed with the same degree of refinement as the present reconnaissance work.

To meet the demands of the mining industry, it does not seem advisable to devote any larger percentage of the appropriations to reconnaissance surveys at the expense of detailed surveys and investigations, and therefore, with funds available, the general work can not be extended any more rapidly than it has been during the last decade. As approximately a fifth of the Territory has been covered by reconnaissance maps, both topographic and geologic, it appears that it will require at least fifty years to cover the whole Territory with the preliminary mapping. It should be added, however, that the areas that have been chosen for survey are those of most importance to the mining industry, and that a fifth or a quarter of the

remaining area may not require survey for many years to come. The fact remains, however, that there are about 200,000 square miles in Alaska which should be surveyed at an early date, and that under the present appropriation it will be impossible in less than two or three decades to accomplish this and at the same time carry on the detailed work demanded by the mining developments.

General investigations.—The field investigations of Alfred H. Brooks, geologist in charge of the division, covered the period from about the end of July till the middle of October. Of the time actually devoted to field work, about two weeks was spent with Mr. Wright on the geology of Kasaan Peninsula, Karta Bay, and the Copper Mountain region—all on Prince of Wales Island. At the same time Mr. Sargent's topographic party, then surveying the Copper Mountain region, was visited. About ten days was spent at Fairbanks with Mr. Covert, Mr. Prindle, and Mr. Katz in becoming familiar with the problems connected with the detailed geology and mining development of the Fairbanks district. The latter part of the season was spent with Mr. Smith in a review of the areal geology of the Solomon and Casadepaga region, together with some reconnaissance work in adjacent areas.

In the office Mr. Brooks has given most of his time to administrative and routine work, in which he was aided by R. H. Sargent, who supervised the Alaskan topographic surveys. During Mr. Brooks's absence in the field E. M. Aten looked after the office work and also rendered valuable services in the compilation of the mineral statistics of Alaska. Most of the month of July was devoted by Mr. Brooks to a continuation of the report on the Mount McKinley region. During the month of December he prepared a summary of the existing knowledge of the mineral resources of Alaska for the Conservation Commission. He also prepared a report entitled "Mining and mineral wealth of Alaska" for distribution at the Alaska-Yukon-Pacific Exposition and a report on the gold, silver, and copper production of Alaska for the "Mineral resources" volume of 1908.

By instructions of the Secretary of the Interior Mr. Brooks prepared a comprehensive scheme for subdivisional surveys in Alaska, reporting that there was a great need for additional land surveys in the Territory. He also prepared a plan for an agricultural reconnaissance of Alaska, which was approved by the Secretary of Agriculture, and Mr. Brooks was thereupon called into conference by the Chief of the Bureau of Plant Industry for consultation on the best methods of carrying out such survey. Realizing the desirability of educating the public on the physical features and resources of Alaska, Mr. Brooks suggested to Secretary Walcott, of the Smith-

sonian Institution, the wisdom of installing a special Alaska exhibit, and at Mr. Walcott's request he outlined a plan for such an exhibit.

Mr. Sargent devoted about four months to the preparation of an exhibit for the Alaska-Yukon-Pacific Exposition. This exhibit included 10 large maps and about 20 small ones showing the geology and mineral resources of Alaska, a large number of photographs and transparencies illustrating methods of mining in the Territory, a complete set of Survey publications relating to Alaska, and a set of about 600 specimens of typical rocks, ores, and minerals. Mr. Sargent was assisted in this work by P. S. Smith, who devoted about six weeks to it, and by other geologists for shorter periods of time. Five draftsmen were employed for periods of one to four months in preparing the maps, their salaries being met by allotment from the federal appropriation for the Alaska building. The preparation of this exhibit seriously interfered with the regular work of the division, and as a consequence two maps and two reports which under ordinary circumstances would have been finished before the field season opened had to be left over until next winter.

Southeastern Alaska.—The detailed geologic mapping of Kasaan Peninsula and the copper-bearing belts of Copper Mountain begun in 1907 was completed in 1908 by C. W. Wright. About 90 square miles have been mapped. These investigations represent the first detailed studies made south of Juneau and form a part of the general plan to make similar studies of all the important producing mining districts. The base maps needed for this detailed geologic work were begun in 1907 by D. C. Witherspoon and were completed in 1908 by R. H. Sargent, who also mapped an area of 53 square miles in the Copper Mountain region. These surveys were made for a publication scale of 1 inch to a mile (1:62,500) with 50-foot contours.

Copper River region.—F. H. Moffit, associated with Adolph Knopf and assisted by S. R. Capps, in 1908 made a reconnaissance survey of the copper and gold bearing belt extending from the head of Copper River across to White River. About 1,800 square miles have been mapped geologically and Mr. Capps, who devoted about one month to topographic surveys, covered an area of 450 square miles.

As detailed study of the copper deposits of this general province must be undertaken before the laws of their occurrence can be determined, and as such detailed studies require a base map, it was decided to prepare such a map of the east end of the Kotsina-Chitina belt. To this work D. C. Witherspoon, assisted by R. M. La Follette, was assigned and surveyed an area of 325 square miles for publication on a scale of 1 mile to the inch, with contour intervals of 50 feet.

Prince William Sound.—The Prince William Sound region has been the scene of several investigations by the Geological Survey, the latest previous to 1908 having been made by U. S. Grant in

1905. The extensive prospecting done in this field and the fact that it has been a large shipper of copper ore made further work imperative. Mr. Grant assisted by D. F. Higgins, was therefore engaged to continue his investigations of this field and to complete the general reconnaissance of the ore deposits of Prince William Sound. The party made geologic reconnaissance surveys of about 600 square miles and a detailed topographic and geologic map of 8 square miles at the north end of Latouche Island. At the close of the season Mr. Grant also made a hasty examination of some of the ore deposits near Seward, on Kenai Peninsula.

Southwestern Alaska.—The general study of the coal fields of Alaska, which was commenced in 1906, was continued during 1908 by a reconnaissance survey of the coal fields of Alaska Peninsula. This work was in charge of W. W. Atwood, assisted by H. M. Eakin. Topographic and geologic reconnaissance surveys of the more important parts of the Herendeen Bay, Unga Island, and Chignik coal fields were made. The total area surveyed was about 1,500 square miles.

Yukon basin.—Last year a topographic survey was made of the Fairbanks placer district for the purpose of obtaining a base map for detailed geologic studies. These studies were carried on this year by L. M. Prindle, assisted by F. J. Katz. They completed the geologic survey of the area covered by the base map (436 square miles) and made a detailed study of the occurrence of auriferous gravel.

To J. W. Bagley was assigned the task of completing the topographic reconnaissance map of the region lying north of and adjacent to Tanana River. He carried a survey eastward along the north side of the Tanana as far as the mouth of Healy River. The latter part of the summer was devoted to topographic mapping near the mouth of the delta, south of Tanana River. In all, an area of 1,725 square miles was covered.

The investigation of the water resources of the Yukon-Tanana district, begun in the Fairbanks region in 1907, was extended by C. C. Covert, assisted by C. E. Ellsworth, in 1908. For the purpose of obtaining data regarding the spring run-off when the melting of the snow takes place in March Mr. Covert proceeded to Fairbanks over the ice. He devoted the early part of the season to a study of the water conditions of the streams tributary to the Chatanika and later proceeded overland to the Circle district, where he met Mr. Ellsworth and party, who came inland by way of White Pass. The balance of the season was devoted to stream gaging in the Circle, Fairbanks, and Baker regions. Twenty-one gaging stations were maintained during the whole or part of the season and 273 measurements of stream volume were made. This work furnishes data in regard to the run-off of about 4,690 square miles.

The great influx of prospectors into the Innoko and lower Yukon region led to a demand for a survey of that district. As funds were not available for a large party, it was decided to make a preliminary examination of the region. This work was intrusted to A. G. Maddren, who spent about a month in examining the creeks tributary to the Yukon reported to be auriferous. He then proceeded to the Innoko and spent the remainder of the season in this field. His work included the making of a sketch map of the region visited, by means of a rough triangulation and foot traverses. A general knowledge of an area including about 1,000 square miles was thus obtained.

Seward Peninsula.—The geology of Seward Peninsula is exceedingly complex, and though its general features have already been determined and the results published, progress has been but slow in deciphering the details of structure and stratigraphy. These problems have an important bearing on the distribution and occurrence of the mineral deposits, especially of metalliferous lodes.

During 1908 two parties were engaged in detailed stratigraphic studies in this region. One of these, in charge of P. S. Smith, spent the summer in completing the detailed mapping of the Casadepaga quadrangle, in continuing the stratigraphic studies of the Kigluaik Mountains, and in making a reconnaissance across the Bendeleben Mountains, 90 square miles being mapped in detail and 150 square miles in reconnaissance.

The stratigraphy of the northwestern part of the peninsula was the subject of investigations by E. M. Kindle, assisted by R. D. Mesler. In connection with this work Mr. Kindle also made a trip to Cape Lisburne and Point Hope for the purpose of establishing stratigraphic correlations.

The investigation of the water resources of Seward Peninsula, so far as they refer to placer mining, was begun in 1906 and continued through 1907 and 1908. In 1908 the work was in charge of F. F. Henshaw, assisted by A. T. Barrows, and observations were continued at some of the gaging stations in the Nome district and also at those established in the Kougarok district. Other stations were maintained in the Iron Creek district, the upper Casadepaga basin, and the Solomon region. In July Mr. Henshaw extended the work into the Fairhaven district, where observations were continued up to the close of the season. These investigations throw light on the available water supply in about 2,000 square miles of the more important placer districts of the peninsula. During the field work 273 measurements of stream volume were made and 21 gaging stations maintained.

Collection of statistics.—The work of collecting statistics from the operators, begun three years ago, was continued through 1908. It is gratifying to note that the operators are showing an increased interest in this work and that most of the large producers are now fur-

nishing the desired information in regard to production. Though the statistical data are by no means yet complete, it is hoped that within another year the figures of production from every important operation may be procured for the purpose of making up the totals. During 1908 the operators of practically every lode mine in the Territory furnished the statistical data requested. There are still many placer miners who have neglected to reply to the inquiries, which are of necessity sent by mail. It is expected, however, that as soon as these men fully realize the purpose of collecting the data and understand that the individual returns are carefully guarded from the public they will be willing to cooperate.

FIELD OPERATIONS FOR SEASON OF 1909.

Under the increased appropriation of $90,000, fourteen parties were dispatched to Alaska during the months of March, April, May, and June. One of these parties is carrying on detailed topographic surveys in southeastern Alaska. Another is doing detailed geologic work in the same region. Another is engaged in making a detailed geologic survey of the Nizina copper-bearing region. A geologic reconnaissance survey of the eastern part of the Kenai Peninsula has also been begun. Two other parties are making a detailed topographic survey of the Matanuska coal field. Two parties have begun a topographic and geologic reconnaissance survey of the Iliamna Lake region. Geologic reconnaissance surveys in the Yukon-Tanana region are being continued. Further investigation of the water resources of the Fairbanks, Birch Creek, and Rampart region is being made. A party is also engaged in making an exploratory survey from Nulato, on the Yukon, to Council, in Seward Peninsula. The survey of the Koyukuk and Chandalar placer district made in 1899 is being extended. In Seward Peninsula two men are engaged in continuing the reconnaissance of the water resources available for placer mining. Mr. Brooks left Washington on June 24 en route to Copper River and Fairbanks.

OFFICE WORK.

During the fiscal year five bulletins have been issued, and there are in press one water-supply paper and one professional paper, all embodying results of the work of the Alaska division. In addition to these reports, which contain maps, one general map of Alaska and one detailed topographic map of the Controller Bay region have been issued as sale publications.

The following manuscripts were submitted for publication in May and June: "The Nabesna-White River copper region," by F. H. Moffitt and Adolph Knopf, including geologic and topographic reconnaissance maps (Bulletin 417); "Geology of the Solomon and Casa-

depaga quadrangles," by P. S. Smith, including detailed geologic map; "The geology and mineral resources of the Prince William Sound region," by U. S. Grant, including geologic reconnaissance map; "The Yakutat Bay earthquake, September, 1899," by R. S. Tarr and Lawrence Martin; "The Innoko gold-placer district, with accounts of the central Kuskokwim Valley and the Ruby Creek and Gold Hill placers," by A. G. Maddren, including geologic and topographic reconnaissance maps (Bulletin 410). The reconnaissance maps of the Fairbanks and Rampart quadrangles have also been submitted for issue as sale publications.

The following reports are in hand: "Geology and mineral resources of the Nome and Grand Central quadrangles," by F. H. Moffit and P. S. Smith (75 per cent completed, held for further field work); "Geology of the Fairbanks district," by L. M. Prindle (75 per cent completed, held for further field investigations); "Geology and mineral resources of parts of the Alaska Peninsula," by W. W. Atwood (10 per cent completed); "An exploration in the Mount McKinley region," by Alfred H. Brooks and L. M. Prindle (90 per cent completed); "Geology and ore deposits of Kasaan Peninsula and Copper Mountain region, Prince of Wales Island," by C. W. Wright (60 per cent completed.) The maps in hand are as follows: Nizina special, scale 1:62,500 (completed); Circle quadrangle, scale 1:250,000 (95 per cent completed); Upper Tanana quadrangle, scale 1:250,000 (40 per cent completed); Copper Mountain special, scale 1:62,500 (75 per cent completed); Kasaan Peninsula, scale 1:62,500 (75 per cent completed).

GEOLOGIC RESULTS.

Among the most important results of the last season's work are the definite proof of the presence of Cambrian rocks in Seward Peninsula, by E. M. Kindle, and the finding of a marine Eocene fauna in association with plant-bearing beds of the Kenai formation on Alaska Peninsula, by W. W. Atwood and E. M. Eakin. Mr. Grant and Mr. Higgins procured definite proof of the unconformable relations between the Valdez and Orca groups of rocks, and the subdivision of the Orca group into formations is an important fact bearing on the geology of Prince William Sound and the adjacent area. In the upper White River region Mr. Moffit and Mr. Knopf proved the Mesozoic age of the intrusive rocks, thus establishing synchroneity with the granites of the Coast Range. They also showed two types of mineralization; in the one native copper occurs in an amygdaloidal greenstone similar to that of the Chitina Valley; in the other gold and copper ores are found in association with Mesozoic intrusive rocks and are similar in character to the mineral occurrences of southeastern Alaska. Mr. Maddren's work shows a

southwestern extension of the Paleozoic and metamorphic rocks of the Yukon-Tanana region into the Innoko and Kuskokwim valleys. The results of the investigations of the Yakutat Bay earthquake of September, 1899, completed during the year, are of far-reaching geologic significance. The surface dislocation produced by the earth's movement is one of the most extensive which has ever been measured.

DIVISION OF MINERAL RESOURCES.

The preparation of reports on the mineral resources of the United States is carried on in the division of mineral resources under an appropriation of $75,000, and in accordance with the organic law of the Survey, which includes a provision that the Geological Survey shall examine the "mineral resources and products of the national domain."

The first of these annual reports was published in 1883 and covered the calendar year 1882. The volume is an annual statistical compilation, but it also contains discussions of the occurrence, development, and uses of the mineral products, the object being to make it a complete compendium of the country's mineral resources. Each annual report covers a calendar year and must therefore necessarily be distributed through two fiscal years.

The report for 1907 was completed, published, and distributed in January, 1909. The report for 1908 was prepared in part, twenty chapters having been completed before the close of the fiscal year 1908–9 and submitted for publication in advance of the volume. The chapters completed and distributed to the public are as follows: Bauxite and aluminum; monazite and zircon; phosphate rock; salt and bromine; and slate. Those submitted for publication but not yet issued are as follows: Asbestos; barytes and strontium; cement; chromic iron ore; fluorspar and cryolite; silver, copper, lead, and zinc in the Central States; gypsum; manganese ores; mica; petroleum; quartz (flint) and feldspar; sand-lime brick; sulphur and pyrite; talc and soapstone; and tin. At the close of the previous fiscal year the manuscript of seventeen chapters had been completed and transmitted for publication.

During January and February preliminary statements of production in 1908, with a review of the conditions prevailing during the year, were given to the press in the form of special bulletins for the following subjects: Gold and silver mining in the United States; copper, lead, and zinc production; the cement industry; a review of the coal-mining industry; and petroleum.

A considerable part of the time of the experts employed in this division is consumed in answering technical inquiries and making visual examinations of mineral specimens that are submitted by

numerous persons for determination. Inquiries for information as to the character of ores are answered as promptly as possible, and such information is given freely where a chemical analysis or assay is not required.

Since August, 1907, the work of the division has been carried on under the supervision of Edward W. Parker, statistician in charge. At the same time Waldemar Lindgren was placed in charge of the section relating to metalliferous statistics (except iron).

Mr. Parker, in addition to his duties as administrative officer, prepares the reports on the production of coal and the manufacture of coke. D. T. Day continues with the division as expert in charge of the work on petroleum. The preparation of the report on the clay-working industries is carried on under the supervision of Jefferson Middleton. E. C. Harder, junior geologist, supervises the reports on production of iron and manganese, and E. F. Burchard, assistant geologist, has charge of the reports on building stones and other structural materials, the intention being to cooperate with the division of geology and the technologic branch, so as to make the reports on these products comprehensive studies of their occurrence, utilization, and markets. F. B. Van Horn, assistant geologist, has charge of the work on phosphate rock and fuller's earth, and the following members of the Survey have been designated to prepare reports on the minor but at the same time important mineral substances: J. S. Diller, asbestos and talc and soapstone; W. C. Phalen, abrasive materials, aluminum and bauxite, bromine, grindstones and whetstones, salt, sodium salts and potash, and sulphur and pyrite; J. A. Taff, asphaltum and bituminous rock; E. S. Bastin, flint and feldspar and graphite; D. B. Sterrett, mica, monazite and zircon, and precious stones; Samuel Sanford, mineral waters; C. A. Davis, peat.

In the metalliferous statistics section, under the charge of Waldemar Lindgren, assisted by H. D. McCaskey, C. E. Siebenthal, F. L. Hess, and B. S. Butler, statistics of the annual production of all metals, except iron, are collected. Three local offices are maintained in Denver, Salt Lake, and San Francisco, in charge of C. W. Henderson, V. C. Heikes, and C. G. Yale, respectively, whose duty it is to collect data of mine production by direct correspondence with the producers. Reports were issued on the production of gold, silver, copper, lead, zinc, quicksilver, platinum, tungsten, tin, arsenic, antimony, and a number of rarer metals. The reports on the more abundant metals are issued in two forms. The first contains what are termed the smelter reports, based on actual production of metals as reported by the smelters. The second, which is termed the mine report, is based on the returns from the individual mines and contains an epitome of the mining operations and output by quantity of metal and tons of ore of all the more important mining camps in the

country. This service, which has been in operation since 1904 for the Western and Eastern States, was extended during the last fiscal year so as to include the Central States. Thus the volume "Mineral resources" contains, in addition to the figures of actual smelter production, a summary of the condition of the metal industry throughout the United States. Preliminary statements of the production of copper, lead, and zinc in 1907 were issued in July, 1908. The detailed mine reports were, unfortunately, somewhat delayed by the vast amount of material to be gathered and were not issued until late in the fall. On January 1, 1909, preliminary statements were issued as to the approximate production in 1908 of copper, lead, and zinc, and also, in conjunction with the Bureau of the Mint, of gold and silver. The smelter production of zinc was made public in April, and the production of copper and lead was announced in final figures at the beginning of June. The report for 1907 contains a map of the mining districts of the United States, which is believed to be a useful addition to the volume.

DIVISION OF CHEMICAL AND PHYSICAL RESEARCH.

The work of the chemical laboratory was seriously crippled by the fire which occurred in the Survey building on December 18, 1908. Although the fire barely touched the laboratory itself, it invaded the corridor leading to the laboratory, destroyed the ventilating plant, and injured the cases containing chemicals and apparatus. The inevitable delays incurred in making the necessary repairs seriously interfered with the work of the laboratory for nearly four months. In all 119 quantitative analyses were reported during the year and 652 qualitative determinations were made.

The personnel of the laboratory has undergone some change. W. F. Hillebrand and E. C. Sullivan resigned from the Survey, to accept positions elsewhere. The vacancies thus created were filled by the appointment of R. C. Wells and Chase Palmer.

Routine work in the laboratory has necessarily followed well-established lines. As in previous years, much of it has devolved on George Steiger and W. T. Schaller. The analyses made have covered the usual ground, and with the following exceptions have shown nothing particularly novel. A telluride and sulphide of antimony, copper, and bismuth was discovered by Chase Palmer in material sent in from the Goldfield (Nev.) district, and a new titanite of iron in material received from Arizona. These minerals are still under investigation.

Some time has been given by F. W. Clarke to the recalculation of the atomic weights. He has also completed the preparation of a bulletin containing the analyses of rocks and minerals made by the Survey laboratory to January 1, 1909. This volume (Bulletin

419), which is now in the hands of the editor, contains more than 2,400 analyses. A résumé of the chemical work of the Geological Survey was also prepared by Mr. Clarke for the International Congress of Applied Chemistry which was held in London on May 31.

Investigations relative to the formation of metallic sulphides have been conducted by R. C. Wells, the hydrolysis of the sulphates of iron being particularly studied.

The sodium-potassium ratio in Ohio River water was determined by Mr. Palmer, thus completing the study of this ratio in typical rivers of the United States. Mr. Palmer also devoted some time to ascertaining the solubility of silica in various organic compounds.

A monographic report on the minerals of the tourmaline region of southern California is in preparation. Some of the material forming the basis of this report was destroyed by fire, but has been replaced by Mr. Schaller, who visited the region for that purpose.

The report on the mercury minerals of Terlingua, Tex., by Messrs. Hillebrand and Schaller has been completed and is in press as Bulletin 405.

For several weeks during the spring M. F. Conner, a chemist from the Canadian Geological Survey, occupied a desk in the laboratory for the purpose of becoming better acquainted with the methods used by this bureau.

In the physical laboratory the experiments on the elasticity of metals at high temperatures have been continued throughout the year under the direction of C. E. Van Orstrand. Preliminary investigations on the diffusivity of solids, sufficient to establish the proper method of procedure, have been completed. Some work has also been done preliminary to an investigation into the formation of rock cleavage. This investigation is to be conducted in cooperation with F. E. Wright, of the Carnegie Institution.

Researches on geophysical problems were continued by G. F. Becker, chief of the division. He also prepared a paper (Bulletin 401) on the relations between local magnetic disturbances and the genesis of petroleum.

TOPOGRAPHIC BRANCH.

ORGANIZATION.

The organization of the topographic branch remained the same as at the close of the last fiscal year, and is as follows:

Chief geographer, R. B. Marshall.

Atlantic division, Frank Sutton, geographer in charge.

Central division, W. H. Herron, geographer in charge.

Rocky Mountain division, E. C. Barnard, geographer in charge.

Pacific division, T. G. Gerdine, geographer in charge.

Inspectors of topography, J. H. Renshawe, geographer; W. M. Beaman and F. E. Matthes, topographers.

PERSONNEL.

The technical corps of the topographic branch was increased during the year by the appointment of 33 junior topographers, 5 assistant topographers, and 34 draftsmen. It was reduced by 11 through death, transfers, and resignations. With these changes, it now includes a chief geographer, 9 geographers, 44 topographers, 48 assistant topographers, 48 junior topographers, and 31 draftsmen. Eight topographers and 5 assistant topographers are on leave without pay. In addition to the above, 175 technical field assistants were employed during a whole or a part of the field season.

SUMMARY OF RESULTS.

The condition of topographic surveys to July 1, 1909, distinguished as to scale, etc., is shown on Plate II.

As shown in the following tables, which give the details of topographic mapping and spirit leveling for the fiscal year, the total new area mapped was 23,831 square miles, making the total area surveyed to date in the United States 1,074,957 square miles, or about 35½ per cent. In addition, 11,200 square miles of revision or resurvey were completed, making the total area of actual surveys for the season 35,031 square miles.

Triangulation stations to the number of 157 were occupied, of which 121 were permanently marked; and in addition 13 points were located by intersections. There were run 2,121 miles of primary traverse, in connection with which 256 permanent marks were set. In the course of this work 22,700 square miles were covered by primary control.

In connection with these surveys 6,597 linear miles of primary levels and 470 miles of precise levels were run, making the total amount of primary and precise spirit leveling done since the authorization of this work by Congress, in 1896, 219,216 miles.

The area covered by topographic surveys in Alaska during the fiscal year 1908–9, as reported in detail on pages 47–55, was about 4,402 square miles—427 for publication on the scale of 1:62,500 and 3,975 for publication on the scale of 1:250,000.

The results of primary triangulation and primary traverse in all States in which field work was in progress during the years 1906, 1907, and 1908 were summarized and prepared for publication as a bulletin.

Present condition of topographic surveys of the United States and new areas surveyed in 1908–9.

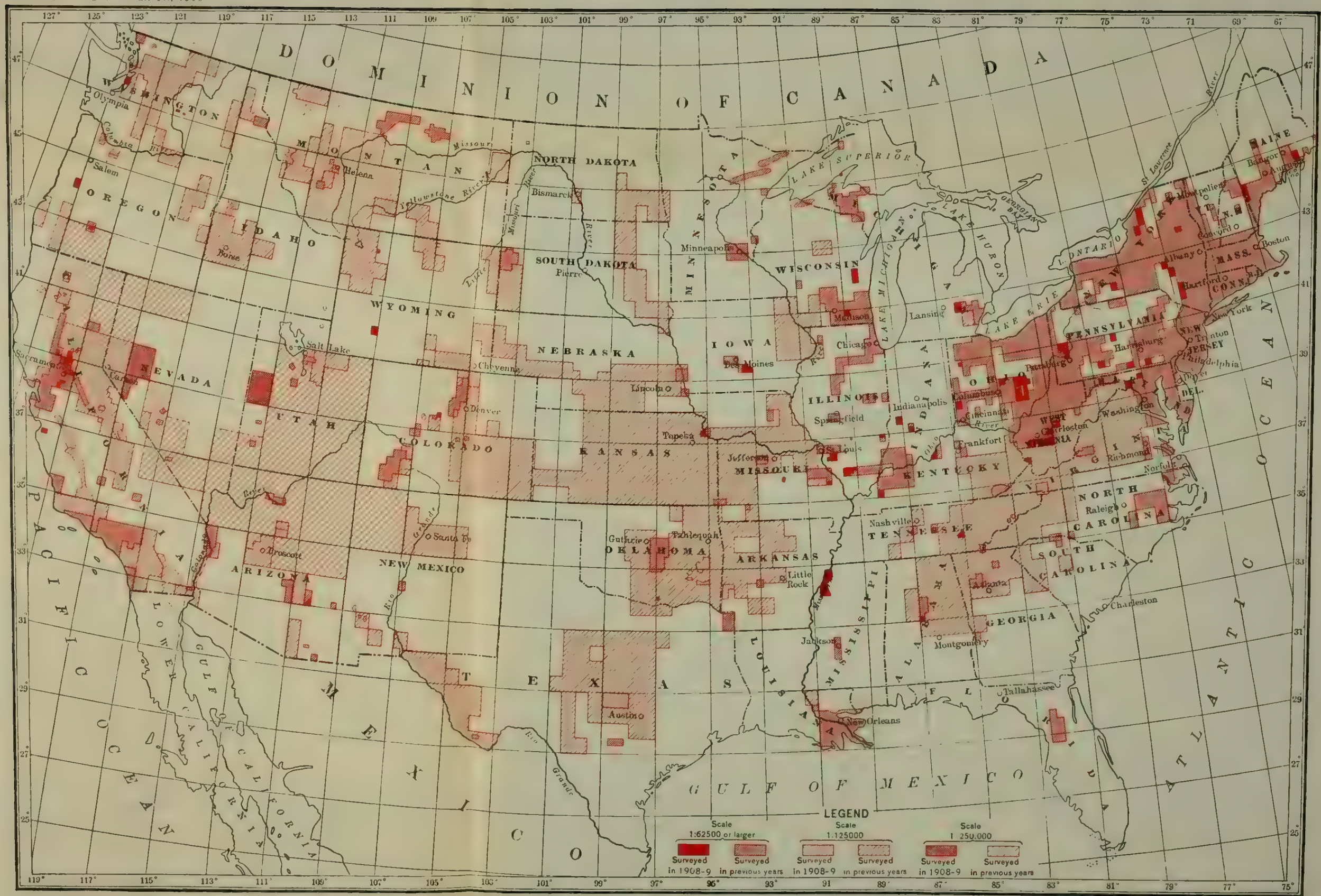
State or Territory.	New area surveyed in 1908–9.	Total area surveyed to July 1, 1909.	Percentage of total area of State surveyed to July 1, 1909.
	Sq. miles.	*Sq. miles.*	
Alabama	.....	18,283	35
Arizona	471	63,433	56
Arkansas	329	20,798	39
California	2,352	84,731	54
Colorado	1,634	40,530	39
Connecticut	.....	4,965	100
Delaware	.....	1,008	43
District of Columbia	.....	70	100
Florida	.....	1,821	3
Georgia	.....	17,087	29
Idaho	642	16,000	19
Illinois	775	8,946	16
Indiana	323	2,941	8
Iowa	174	10,266	18
Kansas	.....	64,159	78
Kentucky	302	16,147	40
Louisiana	.....	7,923	16
Maine	214	7,399	22
Maryland	156	10,450	84
Massachusetts	.....	8,266	100
Michigan	241	4,485	8
Minnesota	.....	3,087	4
Mississippi	746	1,749	4
Missouri	126	34,372	49
Montana	406	49,383	34
Nebraska	.....	25,974	34
Nevada	4,482	48,703	44
New Hampshire	.....	3,376	36
New Jersey	.....	8,224	100
New Mexico	184	30,174	25
New York	764	39,572	80
North Carolina	.....	17,418	33
North Dakota	56	8,975	13
Ohio	2,230	25,297	61
Oklahoma	1,014	38,677	55
Oregon	341	17,674	18
Pennsylvania	1,155	22,184	49
Rhode Island	.....	1,248	100
South Carolina	.....	5,640	18
South Dakota	.....	17,956	23
Tennessee	.....	20,345	48
Texas	.....	66,314	25
Utah	3,732	67,052	79
Vermont	.....	3,537	37
Virginia	.....	29,980	70
Washington	128	18,526	27
West Virginia	.....	24,120	99.8
Wisconsin	416	11,789	21
Wyoming	438	23,903	24
	23,831	1,074,957	.....

ATLANTIC DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Alabama, Delaware, Georgia, Maine, Maryland, Mississippi, North Carolina, New York, Pennsylvania, Tennessee, Virginia, and West Virginia. This work comprised the survey of 20 quadrangles and the revision of 3 quadrangles. In addition, 32 quadrangles were partly surveyed, 2 were partly resurveyed, and large-scale traverse



MAP OF UNITED STATES, SHOWING AREAS COVERED BY TOPOGRAPHIC SURVEYS

AND THE SCALE EMPLOYED FOR EACH AREA

Scale

100 0 100 200 300 miles

1909

surveys were made of 2 districts. The total new area mapped was 3,035 square miles—2,289 for publication on the scale of 1:62,500 and 746 for publication on the scale of 1:31,680. The area resurveyed was 3,219 square miles—553 for publication on the scale of 1:125,000 and 2,666 for publication on the scale of 1:62,500. In connection with this work 1,774 miles of primary levels and 58 miles of precise levels were run and 500 permanent bench marks were established.

Primary triangulation, primary traverse, and precise leveling were carried on at various times by eight parties, the work being distributed over portions of Louisiana, Mississippi, New York, Pennsylvania, Tennessee, Virginia, and West Virginia. The total area covered by this primary control was about 6,400 square miles, of which 2,700 were controlled by primary traverse, 558 miles being run and 88 permanent marks set. The result of this work was to make control available in 26 15-minute quadrangles.

Topographic surveys in Atlantic division from July 1, 1908, to June 30, 1909.

State.	Contour interval.	For publication on scale of—			Total area surveyed.	Levels.		Primary traverse.	
		1:125,000.	1:62,500.			Distance run.	Bench marks.	Distance run.	Permanent marks.
		Resurvey.	New.	Resurvey.					
	Feet.	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Miles.*		*Miles.*	
Alabama	50	131	.....	105	236	12	.....	.....	.....
Delaware	.....	.....	.....	.....	.....	107	24	.....	.....
Louisiana	.....	.....	.....	.....	.....	.....	.....	45	15
Maine	20	.....	214	.....	214	91	18	.....	.....
Maryland	20	.....	156	128	284	52	14	.....	.....
Mississippi	5	.....	.....	.....	[a]746	390	120	285	52
New Jersey	20	.....	.....	275	275	.....	.....	.....	.....
New York	20	.....	764	391	1,155	181	40	122	15
North Carolina	100	20	.....	.....	20	.....	.....	.....	.....
Pennsylvania	20	.....	1,155	.....	1,155	154	42	26	2
Tennessee	20–100	60	.....	177	237	70	17	80	4
Virginia	20–100	342	.....	48	390	181	45	.....	.....
West Virginia	50	.....	.....	1,542	1,542	594	180	.....	.....
		553	2,289	2,666	6,254	1,832	500	558	88

[a] 746 square miles in Mississippi for publication on the scale of 1:31,680.

DETAILS OF WORK BY STATES.

Alabama.—The resurvey of the Montevallo quadrangle, in Shelby, Bibb, and Chilton counties, was completed by R. W. Berry, 105 square miles being mapped for publication on the scale of 1:62,500, with a contour interval of 50 feet. Mr. Berry also revised 131 square miles of the Brookwood quadrangle in Bibb, Hale, Jefferson, and Tuscaloosa counties, and completed the secondary control on the Scale quadrangle, in Russell and Lee counties. For the control of the Columbiana quadrangle, in Chilton and Shelby counties, William Oram ran 12 miles of primary levels.

Delaware.—For the control of the Seaford and Georgetown quadrangles, in Sussex County, H. M. Gillman, jr., ran 107 miles of primary levels and established 24 permanent bench marks.

Georgia.—Secondary control for the Milledgeville quadrangle, in Baldwin, Hancock, and Washington counties, was completed by F. Harrison.

Louisiana.—The president of the board of commissioners of the fifth Louisiana levee district allotted $20,000 for the inauguration of cooperative topographic surveys in the Tensas Basin, and the United States Geological Survey allotted $6,700 for the same work during the next year. For the control of this area C. B. Kendall ran 45 miles of primary traverse and set 15 permanent marks in Madison Parish, in June.

Maine.—For the continuation of cooperative topographic surveys in Maine the State Survey Commission allotted $2,500 and the United States Geological Survey allotted a like sum. The survey of the Ellsworth quadrangle, in Hancock County, was continued, and that of the Fryeburg quadrangle, in Oxford and Cumberland counties, was commenced by Hersey Munroe, F. E. Matthes, R. T. Evans, Ray Purington, E. B. Hillegass, and S. L. Ruggles, the total area mapped being 214 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of these areas, including the Kezar Falls quadrangle in the same counties, 91 miles of primary levels were run and 18 permanent bench marks were established by C. K. Alexander and E. B. Hillegass.

Maryland.—For the continuation of cooperative topographic surveys in Maryland the state geologist and the Federal Survey each allotted $4,000. The resurvey of the Frederick quadrangle was continued and resulted in the completion of work on the Middletown quadrangle, in Washington and Frederick counties, the area mapped being 128 square miles. The survey of the Taneytown quadrangle in Carroll and Frederick counties was commenced, the total new area mapped being 156 square miles. All the work in Maryland was for publication on the scale of 1:62,500, with a contour interval of 20 feet, and was done by J. H. Wheat, S. P. Floore, J. S. B. Daingerfield, Robert Muldrow, A. M. Walker, F. R. B. Waters, and J. D. Forster. For the control of the Williamsport and Hagerstown quadrangles, in Washington, Berkeley, and Jefferson counties, J. Morrison Harris ran 52 miles of primary levels and established 14 permanent bench marks. Mr. Wheat commenced the secondary control on the Emmitsburg quadrangle, in Carroll and Frederick counties.

Mississippi.—Topographic surveys in the Tallahatchie drainage district were continued under the agreement of June 15, 1908, whereby $27,000, more or less, was allotted by the Tallahatchie drainage commission for topographic surveys in that district, to be met by $9,000 on

the part of the Federal Survey. The mapping of the Dundee, Coahoma, Jonestown, and Walnut Lake quadrangles was completed and that of the Lula, Hollywood, Clarksdale, Lake Cormorant, Banks, Sabina, Robinsonville, Moon Lake, Lambert, Prichard, Crenshaw, Tunica, Belen, Shirard, Friars Point, Norfolk, Sledge, Tibbs, and Helena quadrangles was commenced. This work lies in parts of Coahoma, Quitman, Tunica, De Soto, Tate, and Panola counties and was done under the direction of Van. H. Manning by E. P. Davis, R. L. Harrison, S. P. Floore, R. J. Schleich, L. L. Lee, J. R. McMillen, C. C. Gardner, J. M. Rawls, W. H. Monahan, B. Knock, W. H. S. Morey, J. D. Forster, Olin Smith, Duncan Hannegan, and R. H. Reineck, the total area surveyed being 746 square miles, for publication on the scale of 1:31,680, with a contour interval of 5 feet. For the control of the Tallahatchie drainage district 390 miles of primary levels were run and 120 permanent bench marks were established by W. H. Monahan, W. H. Gray, and K. W. Trimble. C. A. Clunet and F. J. McMaugh also ran 225 miles of primary traverse, in connection with which 47 permanent marks were set. In addition to the cooperative work, Mr. McMaugh ran 60 miles of primary traverse and set 5 permanent marks for the control of the Burnsville quadrangle, in Tishomingo and Alcorn counties.

New York.—The state engineer and surveyor allotted $8,000 for the continuation of cooperative topographic surveys in the State, and the Federal Survey allotted a like amount for the same purpose. The survey of the Bath quadrangle, in Steuben County, and the Monticello and Neversink quadrangles, in Sullivan and Ulster counties, was completed; that of the Delhi quadrangle, in Delaware and Otsego counties, was nearly completed; that of the Antwerp quadrangle, in St. Lawrence, Jefferson, and Lewis counties, and the Hartwick quadrangle, in Otsego County, was commenced. The total area mapped was 764 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet, the work being done by T. M. Bannon, R. H. Chapman, L. C. Fletcher, Albert Pike, R. C. Seitz, W. H. S. Morey, R. C. McKinney, and J. M. Whitman. In addition, the revision of the Watertown quadrangle, consisting of 216 square miles in Jefferson and Lewis counties, was completed by Albert Pike. For the control of the above-named areas and for the Canton and Hammond quadrangles, in St. Lawrence and Jefferson counties, 181 miles of primary levels were run and 40 permanent bench marks were established by R. C. Seitz and 122 miles of primary traverse were run and 15 permanent marks were set by F. J. McMaugh.

New York-New Jersey.—The Ramapo and Greenwood Lake quadrangles, in Orange and Rockland counties, N. Y., and Bergen, Passaic, Sussex, and Morris counties, N. J., were revised for culture by C. C. Gardner and R. L. Harrison, the area covered being 450

square miles, 175 of which were in New York, to be republished on the scale of 1:62,500, with a contour interval of 20 feet.

North Carolina.—The state geologist of North Carolina allotted $500 for the continuation of cooperative topographic surveys, for which the Federal Survey allotted a like sum. A traverse survey of Beaufort County, on the scale of 1:24,000, was completed by M. W. Gray and R. F. Irwin.

Pennsylvania.—The Geologic and Topographic Survey Commission of Pennsylvania allotted $12,000 for the continuation of the cooperative topographic survey of the State and the United States Geological Survey allotted a like sum for the same purpose. The survey of the Zelienople quadrangle, in Butler, Lawrence, and Beaver counties; the Bedford quadrangle, in Bedford, Somerset, and Cambria counties; the Bellefonte quadrangle, in Center County; the New Kensington and Butler quadrangles, in Butler, Allegheny, and Westmoreland counties; and the Fairfield quadrangle, in Adams, Franklin, and Cumberland counties, was completed; and that of the Franklin and Stoneboro quadrangles, in Mercer, Forest, and Venango counties; the Hamburg quadrangle, in Berks, Lehigh, and Schuylkill counties; the Quarryville quadrangle, in Lancaster and Chester counties; the Hilliards quadrangle, in Venango and Butler counties; the McCalls Ferry quadrangle, in Lancaster and York counties; and the Mercer quadrangle, in Butler and Mercer counties, was commenced. The total area mapped was 1,155 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet, the work being done by W. O. Tufts, R. H. Reineck, R. D. Cummin, J. D. Forster, Hersey Munroe, J. I. Gayetty, and E. B. Hillegass. For the control of these areas 154 miles of primary levels were run and 42 permanent bench marks were established by H. M. Gillman, jr., and H. W. Peabody. For the control of the Franklin and Stoneboro quadrangles C. B. Kendall ran 26 miles of primary traverse and set 2 permanent marks. For the control of the Confluence, Myersdale, and Hyndman quadrangles, in Somerset and Fayette counties, George T. Hawkins occupied 4 triangulation stations and established 3 permanent marks.

Tennessee.—The resurvey of the Pikeville 30-minute quadrangle was continued by Oscar Jones and Olin Smith, and 177 square miles of the Pikeville 15-minute quadrangle, in Rhea and Bledsoe counties, were completed for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of this area 80 miles of primary traverse were run and 4 permanent marks were set by Mr. Jones, and 70 miles of primary levels were run and 17 permanent bench marks were set by J. B. Metcalfe. Secondary control for the Hollow Springs quadrangle, in Coffee and Cannon counties, was also completed by Mr. Jones.

Tennessee-North Carolina.—J. I. Gayetty completed the revision of 80 square miles of the Mount Guyot quadrangle, 60 of which are in Cocke, Jefferson, and Sevier counties, Tenn., and 20 in Haywood and Swan counties, N. C., for republication on the scale of 1:125,000, with a contour interval of 100 feet.

Virginia.—For cooperative topographic surveys in Virginia the state geologist and the United States Geological Survey each allotted $1,750. A traverse survey of the Virgilina district, in Halifax and Mecklenburg counties, was commenced by J. Morrison Harris on the field scale of 1:24,000. For the control of this area 79 miles of primary levels were run and 24 permanent bench marks were established by E. O. Halbert. In addition to the cooperative work, the resurvey of the Abingdon quadrangle, in Smyth, Russell, and Washington counties, was commenced by Duncan Hannegan, R. W. Berry, J. B. Metcalfe, and R. A. Kiger, the total area mapped being 342 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. For the control of this quadrangle 102 miles of primary levels were run and 21 permanent bench marks were established by J. B. Metcalfe. The Virginia portion of the Middletown quadrangle, in Loudoun County, was completed by Robert Muldrow and A. M. Walker. The area mapped, which was a resurvey of a portion of the Harpers Ferry quadrangle, was 48 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. Triangulation control was extended by Oscar Jones, E. L. McNair, and R. C. Seitz from West Virginia into Tazewell and Buchanan counties.

West Virginia.—For the continuation of cooperative topographic surveys in West Virginia the state geologist allotted $15,000, which was met by an allotment of $12,000 from the Federal Survey. The resurvey of areas previously mapped resulted in the completion of the survey of the Sutton special, Gassaway, Clay, Fayetteville, and Montgomery quadrangles, in Braxton, Nicholas, Webster, Gilmer, Clay, Fayette, and Kanawha counties, and in the completion of parts of the Peytona and Madison quadrangles, in Kanawha, Boone, and Lincoln counties. The survey of the Matewan, Williamson, and Pocahontas quadrangles, in Mingo, Logan, Mercer, and McDowell counties, was also commenced. This work was done by E. I. Ireland, J. R. Eakin, F. E. Matthes, W. L. Miller, E. P. Davis, Fred McLaughlin, F. O. Leonard, R. H. Kilmer, C. P. McKinley, Orr Meredith, L. D. Law, J. H. Wilson, and C. F. Koppisch, the total area mapped being 1,542 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. For the control of these and adjoining areas 536 miles of primary levels and 58 miles of precise levels were run and 180 permanent bench marks were established by C. H. Semper, T. A. Green, A. J. Dailey, S. E. Taylor, and E. S. Dawson. Trian-

gulation control for the Madison, Peytona, and Montgomery quadrangles was established by R. H. Chapman, P. W. McMillen, Geo. T. Hawkins, and C. B. Kendall, 12 stations being occupied and 11 permanent marks set. E. L. McNair, Oscar Jones, R. C. Seitz, and C. P. McKinley also secured triangulation control for the Holden, Gilbert, Logan, Matewan, Williamson, Welch, Iaeger, Bald Knob, Mullen, Pineville, Pocahontas, and Eccles quadrangles, in Mingo, Logan, Boone, Mercer, Wyoming, Raleigh, and McDowell counties, 25 stations being occupied and 25 permanent marks established.

OFFICE WORK.

The drafting of the following sheets was completed: Watertown, Stony Creek, and Bath, N. Y.; York, Bellefonte, Bedford, Fairfield, New Kensington, and Zelienople, Pa.; Middletown, Md.; Gassaway, Clay, Montgomery, Fayetteville, and Sutton special, W. Va.; Coahoma, Jonestown, Dundee, and Walnut Lake, Miss.; Montevallo, Ala.; Virgilina district, Va.; Beaufort and Granville counties, N. C.; Gold Hill and Cid districts, N. C.; Brookwood revision, Ala. The adjustment and drawing of maps of the following counties was completed in cooperation with the Bureau of Soils: Lamar, Henry, Bibb, and Autauga, Ala.; Thomas and Grady, Ga.; Bienville and East and West Carroll parishes, La.; Monroe, Miss.; Robeson, N. C.; Center, Pa.

Progress in the drafting of additional sheets was made as follows: Ellsworth, Me., 77 per cent; Delhi, N. Y., 78 per cent; Neversink and Monticello, N. Y., each 80 per cent; Butler, Pa., 25 per cent; Taneytown, Md., 36 per cent; Peytona and Madison, W. Va., each 85 per cent; Pikeville, Tenn., 55 per cent; Lula and Hollywood, Miss., 88 per cent; Clarksdale, Miss., 72 per cent; Lake Cormorant, Banks, Sabino, Robinsonville, Moon Lake, and Lambert, Miss., each 66 per cent; Pritchard, Miss., 55 per cent; Crenshaw, Miss., 52 per cent; Tunica, Miss., 45 per cent; Belen, Miss., 42 per cent; Friars Point, Miss., 32 per cent; Sherard, Miss., 22 per cent; Norfolk, Miss., 20 per cent; Sledge, Miss., 17 per cent; Tibbs, Miss., 10 per cent; Helena, Miss., 8 per cent.

The following sheets were completely adjusted: Hamburg, McCalls Ferry, Quarryville, and Hilliards, Pa.; Fryeburg, Me.; Seale, Ala.; Hollow Springs, Tenn. The following were partly adjusted: Stoneboro, Pa., 30 per cent; Franklin, Pa., 5 per cent; Mercer, Pa., 45 per cent; Emmitsburg, Md., Hammond, N. Y., and Iuka, Miss., each 50 per cent; Canton, N. Y., 80 per cent; Antwerp, N. Y., 70 per cent; Milledgeville, Ga., 25 per cent.

In the triangulation and computing section the following computations were made:

Level circuits were adjusted in the Georgetown and Seaford (Del.) quadrangles.

Level circuits were adjusted in the Emmitsburg, Hagerstown, and Taneytown (Md.) quadrangles. Latitudes, departures, and geographic positions were computed for the Taneytown quadrangle.

Level circuits were adjusted and latitudes, departures, and geographic positions were computed in the Tallahatchie drainage district (Miss.). Geographic positions were computed in the Burnsville (Miss.) quadrangle.

Level circuits were adjusted in the Antwerp, Bath, Canton, and Hammond (N. Y.) quadrangles, and latitudes, departures, and geographic positions were computed in the Antwerp and Hammond quadrangles.

For the additional control of the Mount Guyot and Knoxville (Tenn.-N. C.) quadrangles, geodetic positions were computed.

Level circuits were adjusted in the Bellefonte, Franklin, Hamburg, Hilliards, and Stoneboro (Pa.) quadrangles. Latitudes, departures, and geographic positions in the Franklin, Hilliards, Stoneboro, and Mercer (Pa.) quadrangles were computed. Geodetic positions in the Berlin, Confluence, Hyndman, and Myersdale (Pa.) quadrangles were computed.

Level circuits were adjusted in the Memphis and Pikeville (Tenn.) quadrangles, and latitudes, departures, and geographic positions were computed in the Pikeville and Hollow Springs (Tenn.) quadrangles.

Level circuits in the Virgilina district (Va.) were adjusted.

Level circuits were adjusted in the Bald Knob, Charleston special, Clay, Clendennin, Dublin, Fayetteville, Gassaway, Gilbert, Hinton, Logan, Madison, Montgomery, Midkiff, Pocahontas, St. Albans, Wayne, Welch, and Peytona (W. Va.) quadrangles. Geodetic positions were computed in the Fayetteville, Logan, Madison, Montgomery, and Peytona quadrangles.

Level lists covering the work done in the entire State of West Virginia were assembled, computations and readjustments being made where necessary, preparatory to issuing a bulletin (Bulletin 399).

CENTRAL DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, Oklahoma, and Wisconsin. This work comprised the survey of 24 quadrangles and the revision of 1 quadrangle. In addition, 12 quadrangles and 1 special area were partly surveyed and 1 special area was partly resurveyed. The total new area

mapped was 4,957 square miles—370 for publication on the scale of 1:125,000, 4,521 for publication on the scale of 1:62,500, and 66 for publication on the scale of 1:24,000. The area resurveyed was 483 square miles—283 for publication on the scale of 1:62,500 and 200 for publication on the scale of 1:24,000. In connection with this work 1,807 miles of primary levels and 45 miles of precise levels were run and 431 permanent bench marks were established.

Triangulation, primary traverse, and precise leveling were carried on at various times by three parties, the work being distributed over portions of Illinois, Iowa, Kentucky, Minnesota, Missouri, and Ohio. The area covered by primary traverse was approximately 5,000 square miles, and by triangulation approximately 1,000 square miles, furnishing control for 24 15-minute quadrangles, 1,278 miles of primary traverse being run and 132 permanent marks set.

Topographic surveys in central division from July 1, 1908, to June 30, 1909.

State.	Contour interval.	For publication on scale of—			Total area surveyed.	Levels.		Primary traverse.	
		1:125,000.	1:62,500.			Distance run.	Bench marks.	Distance run.	Permanent marks.
		New.	New.	Resurvey.					
	Feet.	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Miles.*		*Miles.*	
Arkansas	50	329			329	169	31		
Illinois	5–20		775		775	459	97	432	43
Indiana	20		323		323	52	13		
Iowa	20		174		174	73	22	28	3
Kansas	20				[a] 151	107			
Kentucky	20		302		302	53	9	149	13
Michigan	20		175		[a] 241	68	17		
Minnesota						77	13	166	17
Missouri	20		126	65	[a] 240	161	43	80	8
Ohio	20		2,230		2,230	495	146	423	48
Oklahoma	50	41			41				
Wisconsin	10		416	218	634	138	40		
		370	4,521	283	5,440	1,852	431	1,278	132

[a] 200 square miles of resurvey (151 in Kansas and 49 in Missouri) and 66 square miles in Michigan, all for publication on the scale of 1:24,000.

DETAILS OF WORK BY STATES.

Arkansas-Oklahoma.—The survey of the De Queen quadrangle, in Sevier, Howard, and Polk counties, Ark., and McCurtain County, Okla., was commenced by C. G. Anderson, F. W. Hughes, H. H. Hodgeson, and C. L. Sadler. The total area mapped was 370 square miles, 41 being in Oklahoma, for publication on the scale of 1:125,000, with a contour interval of 50 feet. For the control of this area W. A. Gelbach ran 169 miles of primary levels and established 31 permanent bench marks.

Illinois.—The governor of Illinois allotted $8,000 for the continuation of cooperative topographic surveys in the State and the United States Geological Survey allotted a like sum for the same purpose.

The survey of the Murphysboro quadrangle, in Jackson and Perry counties; the Okawville quadrangle, in Clinton, Washington, and St. Clair counties; the Hardinville quadrangle, in Crawford, Lawrence, and Jasper counties; and the Carlyle quadrangle, in Clinton and Bond counties, was completed; that of the Galena and Apple River quadrangles, in Jo Daviess County; the Baldwin quadrangle, in Randolph County; the Lasalle quadrangle, in Lasalle, Bureau, and Putnam counties, and the Vandalia quadrangle, in Fayette County, was continued; and that of the Bridgeport quadrangle, in Lawrence and Wabash counties; the Hennepin quadrangle, in Putnam, Bureau, and Lasalle counties; the New Athens quadrangle, in St. Clair and Monroe counties; and the Carmi quadrangle, in White, Edwards, Wayne, and Posey counties, was commenced. This work was done by W. J. Lloyd, M. Hackett, E. W. McCrary, Lee Morrison, E. L. Hain, G. L. Gross, J. W. Lowell, S. K. Atkinson, A. L. Hambrecht, A. T. Fowler, J. A. Duck, Frank Tweedy, B. A. Jenkins, J. F. McBeth, and G. R. Hoffman, the total area mapped being 775 square miles, for publication on the scale of 1:62,500, with contour intervals of 20 and 5 feet. For the control of these areas 459 miles of primary levels were run and 97 permanent bench marks were established by W. A. Gelbach. For the control of the Baldwin quadrangle, in St. Clair, Randolph, and Monroe counties; the Shawneetown quadrangle, in Gallatin and Hardin counties; the Waterloo, Sparta, Crystal City, and Renault quadrangles, in Union, Washington, Randolph, and Perry counties; the Lincoln quadrangle, in Logan County; and for the Lasalle, Hennepin, Carmi, and Bridgeport quadrangles mentioned above, J. R. Ellis and C. B. Kendall ran 432 miles of primary traverse and set 43 permanent marks.

Indiana.—The survey of the Bloomington quadrangle, in Monroe, Owen, and Green counties, was completed by C. L. Sadler, who, assisted by L. P. Jerrard, also completed the survey of the Clay City quadrangle, in Clay, Vigo, Owen, and Putnam counties, the total area mapped being 323 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Clay City quadrangle 52 miles of primary levels were run and 13 permanent bench marks were established by Mr. Jerrard.

Iowa.—The state geologist allotted $1,750 for cooperative topographic surveys in Iowa and the Federal Survey allotted a like sum for the same purpose. The survey of the Milo quadrangle, in Marion and Warren counties, was completed, and that of the Knoxville and Pella quadrangles, in Marion and Mahaska counties, was commenced by A. T. Fowler, J. G. Staack, and M. Hackett, the total area mapped being 174 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of these areas 73 miles of primary levels were run and 22 permanent bench marks were estab-

lished by G. E. Heebink, and 28 miles of primary traverse were run and three permanent marks were set by J. R. Ellis.

Kentucky.—For the continuation of the cooperative topographic survey of the State, the state geologist allotted $3,000 and the Federal Survey allotted a like sum. The survey of the Princeton quadrangle, in Caldwell, Lyons, and Hopkins counties, was completed, and that of the Riverview quadrangle, in Jefferson and Bullitt counties, was commenced. This work was done by A. O. Burkland, C. D. S. Clarkson, and R. E. Johnson, the total area mapped being 302 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Princeton quadrangle 53 miles of primary levels were run and 9 permanent bench marks were established by E. C. Bibbee. Primary triangulation was extended through Lewis and Rowan counties by E. L. McNair, and furnished partial control for the Vanceburg, Olive Hill, Soldier, Quincy, and Morehead quadrangles, 8 stations being occupied and 9 permanent marks set. Primary triangulation for the Kentucky portion of the Williamson quadrangle, in Pike and Martin counties, was completed, and that for the east half of the old Prestonburg quadrangle, in Floyd, Johnson, and Lawrence counties, was begun by E. L. McNair and R. C. Seitz, 3 permanent marks being set. For the control of the Shawneetown quadrangle, in Union and Crittenden counties, J. R. Ellis ran 11 miles of primary traverse and set 1 permanent mark. For the control of the Horsebranch, Rochester, and Morgantown quadrangles, in Ohio, Grayson, Butler, Warren, and Logan counties, C. B. Kendall ran 138 miles of primary traverse and set 12 permanent marks.

Michigan.—For the continuation of cooperative topographic surveys in Michigan the state geologist and the United States Geological Survey each allotted $1,000. The survey of the Fowlerville quadrangle, in Ingham and Livingston counties, was completed, and that of the Mason quadrangle, in Ingham County, was commenced. This work was done by C. D. S. Clarkson and A. M. Walker, the total area mapped being 175 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. In addition to the cooperative work, the survey of the Calumet special quadrangle, in Houghton County, was commenced by A. M. Walker, who mapped 66 square miles, for publication on the scale of 1:24,000, with a contour interval of 20 feet. For the control of this area 68 miles of primary levels were run and 17 permanent bench marks were established by F. H. West. Revision of culture on an irregular area included in the Crystal Falls, Iron River, and Ishpeming quadrangles and adjoining areas was accomplished by A. T. Fowler.

Minnesota-Wisconsin.—For the control of the Center City, Stillwater, and Afton quadrangles, in Washington, Chisago, Ramsey, and

Dakota counties, Minn., and Polk, St. Croix, and Pierce counties, Wis., J. R. Ellis ran 166 miles of primary traverse and established 17 permanent marks.

Missouri.—For the continuation of cooperative topographic surveys in Missouri the state geologist and the United States Geological Survey each allotted $5,000. The resurvey of the Ste. Genevieve quadrangle was continued, and resulted in the completion of the Higdon quadrangle, in Ste. Genevieve, Perry, Madison, St. Francois, and Bollinger counties. This work was done by C. G. Anderson and F. W. Hughes, who also partly completed the survey of the Rolla quadrangle, in Phelps and Dent counties. The new area mapped was 126 square miles and that resurveyed was 65 square miles, all being for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Rolla and Sullivan quadrangles 45 miles of precise levels were run by E. L. McNair and 43 miles of primary levels by C. H. Swift, in connection with which 23 permanent bench marks were established, and 80 miles of primary traverse were run and 8 permanent marks set by J. R. Ellis. Leigh D. Townsend ran 37 miles of primary levels and set 10 permanent bench marks for the control of the Kennett quadrangle, in Dunklin County.

Kansas-Missouri.—The resurvey of an area comprising the Fort Leavenworth special quadrangle, in Jefferson, Atchison, and Leavenworth counties, Kans., and Platte County, Mo., was continued by J. G. Staack, the total area mapped being 200 square miles, of which 49 are in Missouri, for publication on the scale of 1:24,000, with a contour interval of 20 feet. For the control of this area G. E. Heebink ran 143 miles of primary levels, of which 36 miles, with the 10 permanent bench marks established, were in Missouri.

Ohio.—The governor of Ohio allotted $19,000 for the continuation of the cooperative topographic survey of the State and a like sum was set apart for the same purpose by the United States Geological Survey. The survey of the Frazeysburg, Conesville, Zanesville, Philo, New Lexington, McConnellsville, and Granville quadrangles, in Knox, Licking, Muskingum, Coshocton, Morgan, Perry, Hocking, and Athens counties; the Cambridge quadrangle, in Guernsey, Coshocton, and Tuscarawas counties; and the Eaton quadrangle, in Preble and Butler counties, was completed. That of the Caldwell, Cumberland, and Antrim quadrangles, in Morgan, Washington, Noble, Coshocton, Muskingum, Harrison, and Tuscarawas counties; and the Delphos quadrangle, in Van Wert and Allen counties, was partly completed; and that of the Navarre, Canal Dover, Carrollton, Coshocton, New Comerstown, and Uhrichsville quadrangles, in Wayne, Stark, Holmes, Coshocton, Tuscarawas, Carroll, Columbiana, and Harrison counties; and the Laurelville quadrangle, in Hocking

and Vinton counties, was commenced. This work was done by J. H. Jennings, J. H. Renshawe, Chas. Hartmann, jr., A. O. Burkland, Fred Graff, jr., O. H. Nelson, H. H. Hodgeson, C. W. Goodlove, J. A. Duck, L. R. Ebert, and C. D. S. Clarkson, the total area mapped being 2,230 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet For the control of these quadrangles 495 miles of primary levels were run and 146 permanent bench marks were set by C. E. Bibbee, S. K. Archer, and H. B. Hoel. For the control of the Eaton quadrangle 23 miles of primary traverse were run and 4 permanent marks were set by J. R. Ellis. For the control of the Berne, Celina, Decatur, Delphos, Loramie, Covington, Troy, Spencerville, and Van Wert quadrangles, in Mercer, Van Wert, Putnam, Allen, Paulding, and Auglaize counties, J. R. Ellis ran 400 miles of primary traverse and set 44 permanent marks.

Wisconsin.—The survey of the Fond du Lac and Neenah quadrangles, in Fond du Lac, Winnebago, and Calumet counties, was completed by H. L. McDonald and W. C. Penn, the total area mapped being 416 square miles, for publication on the scale of 1:62,500, with a contour interval of 10 feet. For the control of these areas 93 miles of primary levels were run and 25 permanent bench marks were set by Edward Bandli. The revision of the Waterloo quadrangle, consisting of 218 square miles in Dodge and Jefferson counties, was completed by A. T. Fowler, E. L. Hain, and W. C. Penn. For the control of this quadrangle 45 miles of primary levels were run and 15 permanent bench marks were set by Edward Bandli.

DRAINAGE SURVEYS IN MINNESOTA.

A further appropriation of $10,000 was made by Congress under the Indian act for the completion of the survey of the swamp areas in the ceded lands of the Chippewas in Roseau, Beltrami, Marshall, Red Lake, and Koochiching counties, the work being assigned by the Secretary of the Interior to the United States Geological Survey. The work was completed by A. P. Meade, approximately 1,700 square miles being covered by a network of levels; 77 miles of primary levels were also run, in connection with which 13 permanent bench marks were established. The maps have been completed and transmitted with the final report to the Secretary of the Interior to be submitted to Congress.

OFFICE WORK.

The drafting of the following sheets was completed: Milo, Iowa; Herrin, Murphysboro, Hardinville, Carlyle, and Okawville, Ill.; Granville, Zanesville, Philo, Conesville, Frazeysburg, McConnellsville, and New Lexington, Ohio; Bloomington and Saline City, Ind.; Princeton, Ky.; Milford and Fowlerville, Mich.; Higdon and Macon,

Mo.; Waterloo, Fond du Lac, and Neenah, Wis.; Leavenworth, Kans.; map of the ceded Chippewa lands of the Red Lake Indian Reservation, Minn.

Progress in the drafting of additional sheets was made as follows: Knoxville, Iowa, 50 per cent; De Queen, Ark., 5 per cent; Fort Leavenworth special, Kans.-Mo., 80 per cent; Calumet special, Mich., 30 per cent; Rolla, Mo., 55 per cent; Antrim, Cumberland, and Eaton, Ohio, 15 per cent.

The following sheets were adjusted: Galena, Apple River, La Salle, Hennepin, and New Athens, Ill.; Caldwell, Summerfield, Uhrichsville, Carrollton, and Laurelville, Ohio; Riverview, Ky.-Ind., 80 per cent; Mason, Mich.

In the triangulation and computing section the following computations were made:

Level circuits were adjusted in the De Queen (Ark.) quadrangle.

Level circuits were adjusted in the Kennett quadrangle (Ark.-Mo.).

Level circuits were adjusted in the Apple River, Beardstown, Bridgeport, Carmi, Clinton, Dawson, Decatur, Hennepin, Kenney, La Salle, Lincoln, Mason City, Mount Carmel, Niantic, Petersburg, and Saidora (Ill.) quadrangles. Latitudes, departures, and geographic positions were computed in the Baldwin, Bridgeport, Carmi, Hennepin, La Salle, and Shawneetown (Ill.) quadrangles. Level lists covering the work done in the entire State of Illinois were assembled, computations and readjustments being made where necessary, preparatory to issuing a bulletin (Bulletin 421).

Level circuits were adjusted in the Clay City (Ind.) quadrangle.

Levil circuits were adjusted in the Knoxville (Iowa) quadrangle and latitudes, departures, and geographic positions were computed in the Knoxville and Pella (Iowa) quadrangles.

Level circuits were adjusted in the Marion, Princeton, and Providence (Ky.) quadrangles. Geographic positions were computed in the Shawneetown, Soldier, and Vanceburg (Ky.) quadrangles. The reduction of azimuth observations in the Horsebranch, Morgantown, and Rochester (Ky.) quadrangles was accomplished.

Level circuits were adjusted in the Calumet special, Fowlerville, and Mason (Mich.) quadrangles. Latitudes, departures, and geographic positions were computed in the Fowlerville and Mason quadrangles.

Latitudes, departures, and geographic positions were computed in the Afton, Center City, and Stillwater (Minn.) quadrangles.

Level circuits were adjusted in the Hayti, Higdon, Knobview, New Madrid, Rolla, St. James, and Weingarten (Mo.) quadrangles. Geographic positions were computed on the Rolla quadrangle. The office computation was made of the precise-level line extending over the De Soto, Rolla, St. James, and Sullivan (Mo.) quadrangles.

Level circuits were adjusted in the Antrim, Caldwell, Cambridge, Conesville, Coshocton, Cumberland, Eaton, McConnellsville, New Comerstown, Philo, Summerfield, and Zanesville (Ohio) quadrangles. Latitudes, departures, and geographic positions were computed in the Berne, Covington, Delphos, Eaton, Loramie, Sidney, Spencerville, and Van Wert (Ohio) quadrangles. Level lists covering the work done in the entire State of Ohio were assembled, computations and readjustments of level circuits being made where necessary, preparatory to issuing a bulletin (Bulletin 411).

Level circuits were adjusted in the Fond du Lac, Neenah, and Waterloo (Wis.) quadrangles.

ROCKY MOUNTAIN DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Colorado, Montana, New Mexico, North Dakota, Oklahoma, Texas, and Wyoming. This work comprised the survey of five quadrangles and four special areas and the revision of six quadrangles. In addition, eight quadrangles and two national forests were partly surveyed and one quadrangle was partly revised. The total new area mapped was 3,691 square miles—134 for publication on the scale of 1:250,000, 3,268 for publication on the scale of 1:125,000, 239 for publication on the scale of 1:62,500, and 50 for publication on the scale of 1:24,000. The area resurveyed was 6,114 square miles—6,091 for publication on the scale of 1:125,000, 18 for publication on the scale of 1:12,000, 2 for publication on the scale of 1:6,000, and 3 on the field scale of 400 feet to 1 inch. In connection with this work 632 miles of primary levels and 344 miles of precise levels were run and 281 permanent bench marks were established.

Triangulation and precise leveling were carried on by four parties. This work was distributed over portions of Colorado, Montana, New Mexico, and Wyoming, covering an area of about 4,600 square miles and furnishing control for five 30-minute quadrangles and two special areas.

Topographic surveys in Rocky Mountain division from July 1, 1908, to June 30, 1909.

State.	Contour interval.	For publication on scale of—			Total area surveyed.	Levels.	
		1:125,000.		1:62,500.		Distance run.	Bench marks.
		New.	Resurvey.	New.			
	Feet.	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Miles.*	
Colorado	20–50–100	1,584	.....	.....	[a] 1,634	591	195
Montana	20–100	406	.....	.....	[b] 409	.....	.....
New Mexico	10–100–200	150	.....	.....	[c e] 202	32	12
North Dakota	50	56	.....	.....	56	.....	.....
Oklahoma	10–20–50	957	3,193	16	[d] 4,168	229	44
Texas	25–50	.....	2,049	.....	2,049	.....	.....
Wyoming	50–100–200	115	849	223	[e] 1,287	124	30
		3,268	6,091	239	9,805	976	281

[a] 50 square miles in Colorado for publication on scale of 1:24,000.
[b] 3 square miles resurvey in Montana on field scale of 400 feet to 1 inch.
[c] 18 square miles resurvey in New Mexico for publication on scale of 1:12,000.
[d] 2 square miles resurvey in Oklahoma for publication on scale of 1:6,000.
[e] 134 square miles (34 in New Mexico, 100 in Wyoming) for publication on scale of 1:250,000.

DETAILS OF WORK BY STATES.

Colorado.—The survey of the Eaton quadrangle, in Larimer and Weld counties, was completed by Frank Tweedy, Gilbert Young, H. S. Starr, and G. W. Lucas, the area mapped being 856 square miles, for publication on the scale of 1:125,000, with a contour interval of 20 feet. The survey of the Breckenridge special quadrangle, consisting of 50 square miles in Summit County, was completed by C. E. Cooke and D. F. C. Moor, for publication on the scale of 1:24,000, with a contour interval of 50 feet. Primary triangulation for this area was done by Mr. Moor, who established 3 stations and set 2 permanent marks. The survey of the Uncompahgre Peak quadrangle, including a small portion of the Cochetopa, Gunnison, and Uncompahgre national forests, in Gunnison and Hinsdale counties, was completed by Gilbert Young and S. T. Penick, the area mapped being 703 square miles, as the Lake City 15-minute quadrangle, which had been previously mapped, was included within it. Primary triangulation for this area was done by Mr. Moor, who occupied 2 stations and set 2 permanent marks. The survey of the Montrose quadrangle, in Montrose, Gunnison, San Miguel, and Ouray counties, was commenced by Mr. Young, no area being mapped. The survey of the Mount Jackson quadrangle, in the Holy Cross National Forest, in Pitkin, Eagle, and Gunnison counties, was continued by S. T. Penick and E. R. Bartlett, the area mapped being 25 square miles. The Uncompahgre Peak and Mount Jackson quadrangles were mapped for publication on the scale of 1:125,000, with a contour interval of 100 feet. For the control of all the areas surveyed in Colorado, 247 miles of primary and 23 miles of precise levels were

run by C. H. Semper, F. J. McMaugh, W. R. Winstead, and R. P. Thompson, 75 permanent bench marks being established. A line of precise levels 321 miles in length, commencing near Denver and extending through Douglas, Denver, Park, Summit, Lake, Eagle, Mesa, and Garfield counties, was run by Mr. Semper, in connection with which 120 permanent bench marks were established.

Montana.—The survey of the Missoula quadrangle, in the Lolo National Forest, in Missoula, Flathead, and Ravalli counties, was continued by Arthur Stiles, William J. Forster, W. M. Kent, and Lee Morrison, the area mapped being 294 square miles. Primary triangulation for this area was done by Mr. Stiles, who occupied 4 stations and set 6 permanent marks. The survey of the Pacific Junction and Avery quadrangles, in Chouteau County, was begun by W. L. Miller, Basil Duke, and G. W. Lucas, the area mapped being 19 square miles. The survey of the Cutbank quadrangle, in Teton County, was commenced by R. W. Berry and H. G. Parry, 93 square miles being completed. All the above work in Montana was for publication on the scale of 1:125,000, with contour intervals of 20 and 100 feet. The survey of a special area in the vicinity of Fort Missoula was made by E. C. Barnard and Arthur Stiles, the area mapped being 3 square miles on the field scale of 400 feet to 1 inch, with a contour interval of 5 feet.

New Mexico.—The survey of the Fort Bayard special area, in Grant County, was completed by C. E. Cooke and S. T. Penick, the area mapped being 18 square miles, for publication on the scale of 1:12,000, with a contour interval of 10 feet. For the control of this area Mr. Cooke located six secondary triangulation stations. The survey of the Graham quadrangle, in Grant and Socorro counties, was commenced by A. B. Searle, A. P. Meade, and R. S. Van Atta, the total area mapped being 150 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The survey of the Alamo National Forest, in Otero and Lincoln counties, was begun by Van. H. Manning and J. H. Wilke, the area mapped being 34 square miles, for publication on the scale of 1:250,000, with a contour interval of 200 feet. Primary triangulation for this area was commenced by R. B. Robertson, who set 6 permanent marks. K. W. Trimble also ran 32 miles of primary levels and established 12 permanent bench marks.

North Dakota.—The survey of the Nesson quadrangle, in Williams and Stark counties, was begun by Glenn S. Smith, Chester Irvine, Conrad Ecklund, and J. H. Van Wagenen, the area mapped being 56 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet.

Oklahoma.—The survey of the Pawhuska quadrangle, in Osage County, was completed by H. G. Parry, D. F. C. Moor, Lee Morrison,

H. S. Starr, J. E. Tichenor, D. B. Penick, William J. Forster, and J. S. Rohrer, the area mapped being 957 square miles, for publication on a scale of 1:125,000, with a contour interval of 50 feet. For the control of this area 220 miles of primary levels were run and 39 permanent bench marks were established by H. G. Parry. The survey of the McComb quadrangle, in Cleveland County, was completed by Lee Morrison, the area mapped being 16 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. The survey of the Platt National Park, in Murray County, was completed by B. A. Jenkins, the area mapped being 2 square miles, for publication on the scale of 1:6,000, with a contour interval of 10 feet. For the control of this park Mr. Jenkins ran 9 miles of primary levels and established 5 permanent bench marks. The revision of the culture on the McAlester, Tuskahoma, and Winding Stair quadrangles, in Pittsburg, Latimer, and Le Flore counties, was completed, and that on the Sallisaw quadrangle, in Le Flore County, was partly completed. The total area revised was 3,193 square miles, to be republished on the scale of 1:125,000, with a contour interval of 50 feet.

Texas.—The revision of the culture in the Llano quadrangle, in Llano County, and in the Burnet quadrangle, in Burnet County, was completed by D. B. Penick and C. P. Jamerson, the area covered being 2,049 square miles, for republication on the scale of 1:125,000, with a contour interval of 25 and 50 feet.

Wyoming.—The survey of the Rock Springs quadrangle, in Sweetwater County, was completed by Glenn S. Smith, Lee Morrison, and H. S. Starr, the total area mapped being 223 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. Primary triangulation for this area was secured by R. B. Robertson, who occupied 7 new stations, intersected 12 stations, and set 11 permanent marks. J. D. Weems also ran 84 miles of primary levels and established 20 permanent bench marks. The survey of the Sheridan quadrangle, in Sheridan County, was commenced by Charles E. Cooke, assisted by P. W. McMillen and F. H. West, the total area mapped being 115 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet. For the control of this area F. H. West ran 14 miles of primary levels and established three permanent bench marks. The survey of an irregular area in the Shoshone National Forest, in Bighorn County, was commenced by E. I. Ireland, the area mapped being 100 square miles, for publication on the scale of 1:250,000, with a contour interval of 200 feet. For the control of this area Otto Meredith ran 26 miles of primary levels and established 7 permanent bench marks. R. B. Robertson extended primary triangulation for the purpose of locating a point on the one hundred and sixth meridian, this being the boundary line between

Crook and Sheridan counties, 12 stations being occupied and 1 point located by intersection. The revision of the culture in the Gallatin quadrangle, in Bighorn County, was completed by Frank Tweedy, the area covered being 849 square miles, to be republished on the scale of 1:125,000, with a contour interval of 100 feet.

OFFICE WORK.

The drafting of the following sheets was completed: Breckenridge special, Eaton, and Uncompahgre Peak, Colo.; New Boston, Linden, Atlanta, and San Marcos, Tex.; Rock Springs, Wyo.; McComb, Pawhuska, and Platt National Park, Okla.; Fort Bayard special, N. Mex.; Fort Missoula special, Mont.; revision of the Tuskahoma, McAlester, and Winding Stair, Okla.; Burnet and Llano, Tex.; Gallatin, Wyo. Progress to the extent of 25 per cent was made in the drafting of the Missoula, Mont., sheet.

In the triangulation and computing section the following computations were made:

The readjustment of primary-level circuits in the Engineer Mountain, Needle Mountains, San Cristobal, and Silverton (Colo.) quadrangles was accomplished. Level circuits in the Uncompahgre Peak, Eaton, and Montrose (Colo.) quadrangles were adjusted and geodetic positions in the Uncompahgre Peak quadrangle were computed. Computations were made for the determination of the elevation of Pikes Peak, in the Pikes Peak special (Colo.) quadrangle. The office computation of the precise-level line extending from Petersburg to Ridgeway (Colo.) was made.

Geodetic positions in the Missoula (Mont.) quadrangle were computed.

Precise-level lists in the Albuquerque, Deming, Eagle, Gallina, Jemes, and Rincon (N. Mex.) quadrangles were revised and prepared.

Level circuits in the Newcomb, Newalla, Pawhuska, and Platt National Park (Okla.) quadrangles were adjusted.

Level circuits in the Bassett, Bogota, Boxelder, and Daingerfield (Tex.) quadrangles were adjusted.

Geodetic positions were computed in the Arvada, Cora, Fremont, Grays River, Grosventre, Hoback, Rock Springs, and Sheridan (Wyo.) quadrangles.

PACIFIC DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington. This work comprised the survey of 8 quadrangles and the resurvey of

11 quadrangles and 2 special areas. In addition, 9 quadrangles and 3 special areas were partly surveyed, and 5 quadrangles were partly resurveyed. The total new area mapped was 12,148 square miles—8,179 for publication on the scale of 1:250,000, 3,198 for publication on the scale of 1:125,000, 577 for publication on the scale of 1:62,500, and 194 for publication on the scale of 1:31,680. The area resurveyed was 1,384 square miles—396 for publication on the scale of 1:125,000, 202 for publication on the scale of 1:62,500, 779 for publication on the scale of 1:31,680, and 7 for publication on the scale of 1:24,000. In connection with this work 2,384 miles of primary levels and 23 miles of precise levels were run and 558 permanent bench marks were established.

Primary triangulation, primary traverse, and precise leveling were carried on at various times by five parties, the work being distributed over portions of Califonia, Oregon, Utah, and Washington. The total area covered by this primary control was about 5,700 square miles, of which 1,400 were controlled by primary traverse, 285 miles being run and 36 permanent marks set.

Topographic surveys in Pacific division from July 1, 1908, to June 30, 1909.

State.	Contour interval.	For publication on scale of—				Total area surveyed.	Levels.		Primary traverse.	
		1:125,000.		1:62,500.			Distance run.	Bench marks.	Distance run.	Permanent marks.
		New.	Resurvey.	New.	Resurvey.					
	Feet.	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Miles.*		*Miles.*	
Arizona	50–100	471	396	.....	.....	867	.....	.....	.....	.....
California	5–25	2,050	.....	122	.....	[a] 3,131	1,242	298	120	18
	50–100									
Idaho	50–100	581	.....	61	.....	642	96	23	.....	.....
Nevada	20–100	.....	.....	.....	.....	[b] [c] 4,489	319	68	.....	.....
Oregon	5–10–50	.....	.....	327	.....	[a] 341	333	84	.....	.....
Utah	100	45	.....	.....	.....	[b] 3,732	248	41	.....	.....
Washington	25–50–100	51	.....	67	202	[b] 330	169	44	165	18
	.....	3,198	396	577	202	13,532	2.407	558	285	36

[a] 973 square miles (779 resurvey and 180 new area in California, 14 new area in Oregon) for publication on the scale of 1:31,680.
[b] 8,179 square miles (4,482 in Nevada, 3,687 in Utah, 10 in Washington) for publication on the scale of 1:250,000.
[c] 7 square miles resurvey in Nevada for publication on scale of 1:24,000.

DETAILS OF WORK BY STATES.

Arizona.—The resurvey of the area covered by the San Francisco Mountains reconnaissance map was continued by T. Foster Slaughter, M. T. Noyes, and J. W. Muller, and resulted in the completion of the work in the Flagstaff quadrangle, in Coconino County, the area mapped being 396 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet.

Arizona-California.—The survey of the Parker quadrangle, in Yuma County, Ariz., and San Bernardino and Riverside counties, Cal., was completed by W. C. Guerin, E. C. Guerin, and J. W. Muller, the area mapped being 635 square miles, 164 of which are in California, for publication on the scale of 1:125,000, with a contour interval of 50 feet.

California.—The Department of Engineering of California allotted $12,000 for the continuation of the cooperative topographic surveys in that State and the United States Geological Survey allotted a like sum for the same purpose. In the Sacramento Valley the resurvey of portions of the Sacramento, Marysville, and Smartsville quadrangles resulted in the completion of the mapping of the Arcade, Antelope, Brighton, Mills, Sheridan, Lincoln, Roseville, Pleasant Grove, New Hope, and Wheatland quadrangles, and in the partial completion of the work in the Folsom, Deer Creek, Scott Ranch, Spencerville, and Yuba City quadrangles. The survey of the Marcuse, Nicolaus, Knights Landing, and Vernon quadrangles, comprising new area, was also completed. The total new area mapped was 180 square miles, in Sutter and Yuba counties, and that resurveyed was 737 square miles, in Placer, Sacramento, Sutter, Yuba, and San Joaquin counties, all being for publication on the scale of 1:31,680, with a contour interval of 5 feet. This work was done by W. H. Griffin, W. R. McKean, J. H. Sinclair, M. A. Knock, B. Knock, E. C. Williams, E. R. Bartlett, T. H. Moncure, E. L. Sellon, John L. Lewis, A. J. Ogle, and W. B. Kern. On account of the interest of the federal geologists in the Salinas, Mariposa, and Mount Goddard quadrangles, additional cooperation for their partial survey was entered into, the amount appropriated being $6,000 each by the Department of Engineering and the United States Geological Survey. The survey of the Salinas quadrangle, in Santa Clara, San Benito, Monterey, and Santa Cruz counties, was commenced by B. A. Jenkins, E. R. Bartlett, T. H. Moncure, W. H. Griffin, and M. A. Knock, 122 square miles being completed, for publication on the scale of 1:62,500, with a contour interval of 25 feet. The survey of the Mount Goddard quadrangle, in the Sierra National Forest, in Fresno and Inyo counties, was continued by George R. Davis, assisted by Edward Hyatt, jr., the area mapped being 485 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The survey of the Orestimba-Panoche-Cantua special area, in Merced, Stanislaus, Fresno, and Monterey counties, was commenced by George R. Davis, T. H. Moncure, J. H. Sinclair, R. M. La Follette, and J. E. Blackburn, the total area mapped being 1,299 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. For the control of the cooperative areas and for the Mariposa quadrangle 1,206 miles of primary levels and 23 miles of precise levels were run and

294 permanent bench marks were established by B. A. Jenkins, W. H. Monohan, W. H. Barringer, and L. F. Biggs; 120 miles of primary traverse were run and 18 permanent marks were set by M. A. Knock. Primary triangulation for the control of the Sacramento Valley areas, the Salinas and Mariposa quadrangles, and the Orestimba-Panoche-Cantua special area was done by C. F. Urquhart, 56 stations being occupied and 31 permanent marks set. In addition to the cooperative work in California, the survey of the Smartsville special area, in Yuma and Nevada counties, was completed by J. P. Harrison, W. R. McKean, and C. F. Eberly, the area resurveyed being 42 square miles, on the field scale of 1:31,680, with contour intervals of 5 and 25 feet. The survey of the Mariposa quadrangle, which lies partly in the Sierra National Forest, in Mariposa and Madera counties, was commenced by C. H. Birdseye, assisted by T. P. Pendleton, the area mapped being 102 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The survey of the Big Bar quadrangle, in the Trinity National Forest, in Trinity County, was continued by J. P. Harrison, no area being mapped. Leveling for the Bridgeport quadrangle, in Mono County, was commenced by C. M. Weston, who ran 13 miles and established 4 permanent bench marks.

Idaho.—The survey of the Meadows quadrangle, in the Weiser National Forest, in Boise and Washington counties, was continued by J. E. Blackburn, A. O. Burkland, and E. A. Lincoln, the total area mapped being 466 square miles. The survey of the Montpelier quadrangle, in the Bear River and Caribou national forests, in Bear Lake County, was commenced by A. E. Murlin and M. A. Knock, the area mapped being 104 square miles. For the control of this area L. F. Biggs ran 96 miles of primary levels and established 23 permanent bench marks. The survey of the Cataldo quadrangle, in the Cœur d'Alene National Forest, in Shoshone, Bonner, and Kootenai counties, was continued by W. O. Tufts, J. W. Muller, and O. G. Taylor, the area mapped being 11 square miles. All the work in Idaho was for publication on the scale of 1:125,000, with contour intervals of 50 and 100 feet.

Nevada.—The survey of the Carson Sink quadrangle, in Churchill, Lyon, Nye, and Esmeralda counties, was completed by W. M. Beaman, J. P. Harrison, J. E. Blackburn, and Fred McLaughlin, the total area mapped being 3,687 square miles. The survey of the Hawthorne quadrangle, in Esmeralda County, was commenced by C. G. Anderson, who surveyed 795 square miles. The mapping of both of these quadrangles was done for publication on the scale of 1:250,000, with a contour interval of 100 feet. For their control T. A. Green ran 284 miles and C. M. Weston 35 miles of primary levels, in connection with which 68 permanent bench marks were set. The revision of the Gold-

field special area, consisting of 7 square miles in Esmeralda and Nye counties, was completed by W. M. Beaman, for publication on the scale of 1:24,000, with a contour interval of 20 feet.

Oregon.—The state engineer allotted $2,500 for the continuation of cooperative topographic surveys in Oregon, which was met by a like sum from the United States Geological Survey. The Eugene quadrangle, in Lane County, was completed by J. P. Harrison, C. E. Giffin, B. A. Jenkins, and R. M. LaFollette, the area mapped being 213 square miles, for publication on the scale of 1:62,500, with a contour interval of 10 feet. The survey of the Willamette Valley quadrangle, in Benton and Polk counties, was commenced by Robert Muldrow, who mapped 14 square miles, for publication on the scale of 1:31,680, with a contour interval of 5 feet. For the control of these areas C. E. Giffin, W. R. Chenowith, and W. B. Kern ran 95 miles of primary levels and established 19 permanent bench marks. Triangulation control was established by Pearson Chapman, who occupied 10 stations and set 6 permanent marks. In addition to the cooperative work, the survey of the Crater Lake quadrangle, in Klamath County, was commenced by Mr. Chapman, the area mapped being 114 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. For the control of these and adjoining areas 238 miles of primary levels were run from Ashland, through Crater Lake National Park, to Prineville, in connection with which 65 permanent bench marks were set by L. F. Biggs.

Utah.—The survey of the Fish Springs quadrangle, in Millard and Juab counties, was completed by Fred McLaughlin, the area mapped being 3,687 square miles, for publication on the scale of 1:250,000, with a contour interval of 100 feet. For the control of this area T. A. Green ran 248 miles of primary levels and established 41 permanent bench marks. The survey of the Randolph quadrangle, which lies partly in the Bear River National Forest, in Rich and Cache counties, was commenced by Albert Pike, the area mapped being 45 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. Primary triangulation for this area was done by C. F. Urquhart, who occupied 8 stations and set 6 permanent marks.

Washington.—The Board of Geological Survey of Washington allotted $10,000 for the purpose of beginning cooperative topographic surveys in the State, which was met by a like sum for the same purpose by the United States Geological Survey. The survey of the Mount Vernon quadrangle, in Skagit and Snohomish counties, was begun by J. R. Eakin and G. V. Brown, the area mapped being 51 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet. For the control of this area W. A. Gelbach ran 70 miles of primary levels and set 15 permanent bench marks,

and C. A. Clunet ran 165 miles of primary traverse and set 18 permanent marks. The survey of the Quincy and Morrison quadrangles, in Grant County, was begun by C. F. Eberly and H. L. McDonald, the area mapped being 67 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet. For the control of these areas C. H. Semper ran 99 miles of primary levels and established 29 permanent bench marks. In addition to the cooperative work, the survey of the Mount Baker quadrangle and adjoining areas in the Washington National Forest, in Skagit County, was continued by J. E. Blackburn, the area mapped being 10 square miles, for publication on the scale of 1:250,000, with a contour interval of 100 feet. The revision of the Seattle quadrangle, in King County, was completed by C. F. Eberly and J. G. Hefty, the area covered being 202 square miles, for republication on the scale of 1:62,500, with a contour interval of 25 feet.

IDAHO-WASHINGTON BOUNDARY LINE.

An appropriation of $25,000 was made by Congress for the survey of the Idaho-Washington boundary line, and the work was placed under the charge of the United States Geological Survey by the Secretary of the Interior. The survey was undertaken by S. S. Gannett, C. L. Nelson, and S. G. Lunde, who completed 135 miles of the line, which was marked by 112 iron monuments 6 feet long, 4 inches in diameter, filled with concrete, and by 21 granite monuments 6 feet long and 10 inches square. In addition to these, 174 iron monuments 4 feet long and 3 inches in diameter, filled with concrete, were placed at the closing corners of the public-land surveys. In connection with this work, the topography of an area 1 mile in width along 61 miles of the line was mapped by Mr. Nelson and Bayard Knock, for publication on the scale of 1:62,500. The rest of the boundary line surveyed lies in country already mapped by the United States Geological Survey.

OFFICE WORK.

The drafting of the following sheets was completed: Flagstaff, Ray, and Parker, Ariz.; Eugene, Oreg.; Carson Sink, Nev.; Fish Springs, Utah; Rio Vista, Isleton, Jersey, Bouldin, New Hope, Headreach, Woodbridge, Castile, Galt, Bonceville, Roseville, Pleasant Grove, Lincoln, Sheridan, Vernon, Knights Landing, Nicolaus, Marcuse, Wheatland, and Deer River, Cal.; cultural revision for the Goldfield special, Nev.; Seattle, Wash.; and Smartsville special, Cal.

Progress in the drafting of additional sheets was made as follows: Folsom, Cal., 40 per cent; Meadows, Idaho, 50 per cent.

In the triangulation and computing section the following computations were made.

Level circuits were adjusted in the Benson, Blaisdell, San Simon, Tucson, and Williams (Ariz.) quadrangles. Geodetic positions were computed in the Cochise, Chiricahua, Pearce, and San Simon (Ariz.) quadrangles.

Level circuits were adjusted in the Antioch, Auburn, Cambria, Capitola, Clarksburg, Coalinga, Dunnigan, Etna, Fairoaks, Folsom, Fresno, Grimes, Hatchville, Hollister, Hoopa, Knights Landing, Lincoln, Loma Prieta, Los Banos, Mariposa, Merced, Newman, Panoche, Pejero, Preston, Rio Vista, Salinas, San Martin, San Jose, Santa Cruz, Sawyer Bar, Seiad, Smartsville, Stockton, Wheatland, Woodbridge, Yuba City, and Yreka (Cal.) quadrangles. The computation of triangulation done in the State during 1908 was made in the Sacramento office.

The computation of the field notes of the resurvey of the Washington-Idaho boundary line was made.

Level circuits in the Carson Sink (Nev.) quadrangle were adjusted.

The office computation of the level line extending from Ashland to Prineville (Oreg.) and over the Crater Lake and Jacksonville (Oreg.) quadrangles was made.

Level circuits in the Fish Springs (Utah) quadrangle were adjusted.

Level circuits in the Mount Adams, Mount Baker, Simcoe, and Zillah (Wash.) quadrangles were adjusted. Level lists, including circuits of level lines, in the Moses Lake (Wash.) quadrangle were revised. Computations of latitudes, departures, and geographic positions on the Mount Vernon (Wash.) quadrangle were made.

COMPILATION OF SPECIAL NATIONAL-FOREST MAPS.

The work of preparing the folios of the atlas of the national forests was continued under the direction of A. C. Roberts.

The maps were made on the scale of 1 mile to the inch and published with six townships to the page. All the work of the United States Geological Survey, the General Land Office, and the Hayden, Transcontinental, and Wheeler surveys, as well as that of private surveys, was incorporated in the maps. The status of all lands inside of the forests was obtained in greatest detail from the records of the General Land Office by expert status clerks, and the land classification and the improvements in the forests from the maps of the Forest Service, all these data being shown in colors and symbols on the compiled maps.

Folios were finished during the fiscal year 1908–9 for the following forests: Luquillo, Angeles, Holy Cross, Lolo, Las Animas, Kansas,

La Sal, Sitgreaves, Battlement, Coronado, Pocatello, Beartooth, Cheyenne, Teton, Medicine Bow, Absaroka, Sioux, Gunnison, Kaibab, Shoshone, Caribou, Custer, Apache, Sundance, Targhee, Arapaho, Wyoming, Routt, Pecos, and Nebraska, all of which have been lithographed and delivered to the Forest Service.

The following were compiled and are now in the hands of the engraver: Fillmore, Cœur d'Alene, Dixie, Arkansas, Chiricahua (New Mexico portion), San Isabel, Garces, Jefferson, Coconino, Montezuma, Moapa, Minidoka, Bonneville, Tonto, Missoula, Carson, Jemez, Humboldt, White River, Bighorn, Cochetopa, and Uncompahgre.

Folios of the following forests were practically completed: Nezperce, Datil, Modoc, Stanislaus, Powell, Uinta, Cleveland, Tahoe, Pend Oreille, Idaho, Payette, Weiser, Toiyabe, Oregon, Alamo, Prescott, Challis, Kootenai, and Sevier.

The Ashley, Ocala, Caldwell, Inyo, Sierra, Fish Lake, Nebo, and Gila folios were compiled, but the final tracings were not finished; the Ozark, Deerlodge, Beaverhead, Deschutes, Crook, Mono, and Santa Barbara folios were partly compiled; and the San Luis, Sequoia, Umpqua, Cascade, and Cabinet folios were commenced.

INSPECTION OF TOPOGRAPHIC SURVEYING AND MAPPING.

During the season only a small amount of field inspection of topographic mapping was done, as the inspectors were engaged for the greater part of the season in regular topographic field work. J. H. Renshawe, after the completion of his field work in Ohio on the Granville quadrangle, was engaged for the balance of the season in the inspection of work in the Central and Atlantic divisions. After the completion of the revision of the Goldfield special area in Nevada, W. M. Beaman did a small amount of inspection in California. F. E. Matthes devoted his whole time in the field to the demonstration of methods and style of topographic mapping applicable to the country worked in Maine and West Virginia.

During the office season careful attention was given by Messrs. Renshawe and Beaman to the final drawing of topographic sheets, for the purpose of eliminating personal mannerisms and errors of expression, also to the examination of the finished sheets. Mr. Matthes's time was devoted to the inking of his field sheets, to the completion of the report on the Yosemite National Park, and to the revision of the book of instructions for field and office work.

INSTRUMENTS AND TOPOGRAPHIC RECORDS.

During the year all the topographic instruments in the office were examined, and all that were found to be worn out, useless, or of obso-

lete types were condemned by a committee appointed by the Director. Some of these were deposited in the National Museum, and the remainder were sold at auction. All minor repairs to instruments were made in the Survey shop, the extensive repairs and remodeling being done by outside contractors, as heretofore. In December, 1908, Survey instruments to the value of about $15,000 were destroyed by fire, but all of them were replaced by authorization of Congress, which made a special appropriation therefor.

Thirty-one hundred items were added to the files of topographic records during the year. The triangulation and level plats of all States, the card catalogue of triangulation and primary-traverse stations, and the card catalogue of bench-mark descriptions and elevations were brought up to date.

MAP OF THE UNITED STATES.

Work on the 1:1,000,000 scale map of the United States was begun in July under the direction of A. F. Hassan, and the following progress was made:

The Florida portions of sheets G, H–14, and H–15 were completed; about 90 per cent of the coastal-plain area in North Carolina (sheets I–13, I–14, and J–13) was compiled and about 15 per cent inked and lettered; about 75 per cent of South Carolina (sheet I–14) was compiled; about 95 per cent of the land lines of Illinois (sheets J–15, J–16, K–15, and K–16) were adjusted, about 40 per cent being compiled and 15 per cent inked; about 90 per cent of sheet K–12 (portions of New Hampshire, Massachusetts, Connecticut, and Rhode Island) was compiled and inked; about 30 per cent of sheet K–13 (parts of New York, Vermont, Massachusetts, Connecticut, Pennsylvania, and New Jersey) was compiled; a special sheet of Wisconsin (K–15), latitude 42° 00′ to 44° 00′, longitude 87° 30′ to 90° 00′, was completely compiled and inked, and about 70 per cent of the lettering finished.

WATER-RESOURCES BRANCH.

The work of the water-resources branch during the year has consisted of investigations of (*a*) surface water, (*b*) underground water, (*c*) the quality of water, and (*d*) the effect of mining débris.

SURFACE-WATER INVESTIGATIONS.

The principal work in the investigation of surface waters is the determination of stream flow. For this purpose permanent stations are established on chosen rivers at selected points and the daily discharge is determined by proper engineering means, a description of which is not necessary to this report. Such work, carried on for a series of years, results in a continuous record of the flow of the rivers that covers all extremes of high and low water. So far it has not been possible with the money available to conduct this work in all parts of the country, or indeed in any part, with the thoroughness that is necessary to obtain the results that the importance of the work demands. To do the work as it should be done would require an appropriation at least twenty times that now made, or, in other words, $2,000,000 annually instead of the $100,000 that has been available during each of the last two years and has been appropriated for the next fiscal year.

It is not necessary, however, to expend such an amount in order to procure results of enormous value. If $200,000 were appropriated, as in the four years from 1902 to 1906, a very good showing could be made, and, although the work would have to continue for a longer period than if a larger amount were made available, nevertheless in the course of time all the necessary facts could be gathered.

During the last fiscal year the Survey has maintained 347 gaging stations in the United States. The stations are well scattered over the entire country, except in certain low-lying portions. The greatest number per unit of area are located in the high mountains, where critical conditions of run-off exist. In addition to these stations 128 stations have been maintained in cooperation with the Reclamation Service, 82 stations in cooperation with private persons, and 272 stations in cooperation with States. The cooperating States, under special or general legislative authority, have furnished the funds necessary to maintain these stations, which have been established for their own particular purposes. The results obtained are, of course, useful in general and special ways for the purposes of the Geological Survey, and they contribute largely to the sum total of information available.

The following is a list of stations by States:

Gaging stations maintained wholly or in part by United States Geological Survey.

State.	Number of stations maintained during fiscal year 1908–9.				
	By the Survey.	In cooperation with—			Total.
		States.	Reclamation Service.	Private persons.	
Alabama	8			1	9
California	38	24		a 18	80
Colorado	6	18	5	21	50
Connecticut	1			1	2
District of Columbia	1				1
Georgia	23				23
Idaho	7	3	12		22
Illinois	2	18			20
Indiana	2				2
Iowa	1	1			2
Maine	4	10		11	25
Maryland	1	7			8
Massachusetts		2		4	6
Michigan	7			9	16
Minnesota	2	33		1	36
Mississippi	2	8			10
Missouri	1				1
Montana	23	20	50		93
Nebraska		7			7
Nevada	5		8		13
New Hampshire				6	6
New Jersey	3				3
New Mexico	13	3	7		23
New York	16	28		3	47
North Carolina	13	12			25
North Dakota	10	8	2		20
Ohio	2	1			3
Oregon	40	40	8		88
South Carolina	4				4
Tennessee	10				10
Utah	24	7	7		38
Virginia	18			2	20
Vermont		9			9
Washington	18	10	26		54
West Virginia	24				24
Wisconsin	4			5	9
Wyoming	14	3	3		20
	347	272	128	82	829

a Maintained by the city of Los Angeles.

Other features of the surface-water investigations consist of the survey of rivers to determine their slope and the survey of sites for reservoirs. These surveys, however, have been few in number and are not at the present time regarded as so important as the determination of stream flow.

GROUND-WATER INVESTIGATIONS.

The investigation of the water resources that exist below the surface of the ground equals in importance that of surface waters. The soil and the rocks are our greatest reservoirs. They supply more people with domestic water than all the streams, and in certain sections of the country underground water has been the chief source of the prosperity that they now enjoy. The determination of ground-

water supplies is largely a geologic study, for the water that sinks into the ground is governed in its course and occurrence by the character of the rock formations which it encounters and through which it passes.

The total allotment made for ground-water investigations for the fiscal year 1909 was $12,650, of which $4,150 was transferred for expenditure under the chief geologist in the investigation of the geology and ground waters of the Coastal Plain of the Atlantic and Gulf States. The remaining allotment of $8,500 was insufficient to maintain the regular members of the staff and to continue the investigations under way by the special experts from various universities. In order, therefore, that the division might not be disorganized, two supplementary agreements were entered into. By the terms of one of these agreements H. R. Johnson was assigned to the geologic branch for one-half of the fiscal year to assist in the investigation of the oil fields of California, the water-resources branch agreeing to employ him during the remainder of the year. Under the second agreement the State of Utah, through Caleb Tanner, state engineer, agreed to pay the field expenses of O. E. Meinzer while he carried on an investigation in that State, his salary and a few incidental expenses to be borne by the Federal Survey. By virtue of these adjustments it became possible to hold together the force throughout the year and to take up three new problems.

G. A. Waring, who at the close of the fiscal year 1908 had completed his reports on the geology and ground waters of south-central Oregon, was assigned to make a systematic study of the springs of California, especially those that are reputed to have medicinal properties and are the principal attraction of pleasure and health resorts. It is estimated that this work will require two years for completion.

The second new investigation undertaken was that of the occurrence, distribution, and quantity of the underground waters in the Antelope Valley and adjacent parts of the Mohave Desert in Los Angeles and San Bernardino counties. H. R. Johnson was assigned to this field for such portion of his time as was to be given to the water-resources branch. He entered the field early in November and completed the field investigations in January, reaching the Washington office about the middle of February. By a supplementary agreement he was assigned to the geologic branch for an additional two months. At the close of the fiscal year the preparation of Mr. Johnson's report on the field work was well under way, and he expected to complete it by August 1.

The third of the new investigations undertaken was that supported jointly by the United States Geological Survey and the State of Utah. O. E. Meinzer received this assignment, his particular field being Juab, Millard, and Iron counties in southwestern Utah. This

work was so distributed as to supplement and coordinate with that done in earlier years by G. B. Richardson and W. T. Lee. Mr. Meinzer's field work closed about the 1st of November, 1908, and soon thereafter he returned to the Washington office, where he was directed to complete the preparation of a report on the ground waters of southern Minnesota begun some years ago by M. L. Fuller and C. W. Hall. He was occupied through practically all of the last half of the fiscal year with this work, and the manuscript of the report was submitted about the middle of June, 1909.

The responsibility for the classification of irrigable and nonirrigable lands, thrown upon the Survey by the passage of the "enlarged homestead act," made advisable the examination of particular areas. On the completion of the Minnesota report Mr. Meinzer was sent to New Mexico to make certain of these examinations and to supplement his work of the summer of 1908 in the Utah field, it having been found that additional information was required before a satisfactory report could be prepared.

Prof. C. H. Gordon, of Knoxville, Tenn., has continued the preparation of two reports on the geology and ground waters of portions of northern Texas. The first of these reports was submitted to the Survey early in the calendar year 1909, and at the close of the fiscal year some progress had been made on the second report.

Prof. W. H. Norton and Prof. W. S. Hendrixson, of Iowa, have made some progress during the year on their report on Iowa's ground waters; but university duties require the greater part of their time and energy, and during the coming fiscal year Mr. Meinzer, who is familiar with the Iowa field, will be assigned thereto for a short time in order that some delayed field work may be done and the report completed.

W. C. Mendenhall, in charge of ground-water investigations, remained in the Washington office until the latter part of August, 1908, completing a preliminary report on the ground waters of the San Joaquin Valley, California, which was submitted for publication about the 1st of September. He then joined Mr. Waring in California, and early in October spent several weeks with Mr. Meinzer in southwestern Utah reviewing his work there. Later Mr. Mendenhall went to Tucson, Ariz., to go over with Professor Smith, of the University of Arizona, a field in the Santa Cruz and Rillito valleys, in which certain experiments had been conducted to determine the amount and availability of the underflow.

In the spring of 1909, at the suggestion of W. H. Code, chief engineer of the Indian Service, an agreement was entered into by the terms of which the Geological Survey has undertaken to investigate the underground-water conditions in the Moki and Navajo reservations. The Office of Indian Affairs has set aside $3,000 for the work,

and Prof. H. E. Gregory, of Yale University, has been assigned to the field. He and Mr. Mendenhall spent the month of May with M. R. Campbell, of the geologic branch, and H. F. Robinson, of the Indian Service, superintendent of irrigation for Arizona and New Mexico, visiting the reservations and determining the fields to be specially investigated and the best methods of carrying out the work. Professor Gregory will complete his researches in August or September and will prepare a final report some time thereafter, the agreement being that preliminary reports shall be sent to the Office of Indian Affairs from the field immediately after the completion of each important unit in the problem.

INVESTIGATIONS OF THE QUALITY OF WATER.

The water resources are not determined on the completion of studies concerning the amount of water. A complete inventory, adaptable for use, requires that the quality of the waters also be considered. No investigations of this sort have been made during the past year, except those in cooperation with the State of California. In previous years a large amount of data had been accumulated, and the effort of the past year has been concentrated on the compilation and assembling of these data and the making of proper deductions for reports. These reports relating to the quality of water in various parts of the country and its industrial usefulness are in preparation and will be published at an early date.

DÉBRIS INVESTIGATION.

The investigation of problems connected with the overloading of California rivers by mining débris was continued under the charge of G. K. Gilbert. The work included additional measurements of pits excavated by hydraulic mining and additional studies of the contributions to the detrital load of streams through the cultivation of the soil and the grading and use of wagon roads. In the hydraulic laboratory of the Survey at the University of California further study was made of the laws controlling the transportation of detritus by running water. Experiments with assorted detritus washed through straight channels were supplemented by others with mixed detritus and by a series with crooked channels. The general series of experiments representative of natural stream work, in which the bed of the channel is composed of detritus and its form is determined by the stream itself, was carried to completion, and a second series was begun representative of flumes and other artificial channels in which the form of the channel bed is rigid and unchanging. Incidental to this work was an experimental study of a specially constructed Pitot or Darcy current gage. A report on the overloaded rivers is in hand.

STATE COOPERATION.

It has been the custom during previous years for States which so desired to cooperate with the Geological Survey along certain lines of investigation, for the purpose of procuring the final results at an earlier time than would be possible under the limited allotments that the Survey is obliged to make. Such cooperation has been helpful and has figured largely in the scope of the work. The States, either by special legislative appropriation or from a general fund that may be so expended, make allotments to be used for this work, under the general supervision of the Director of the Federal Survey.

In some States the amounts allotted by each party are equal; in others the Survey pays a larger or smaller part, according to its estimate of the comparative importance of the work or the limit of the Survey's appropriation. The practice is to give due consideration to the demands and needs of the various States for such investigations and to allot the appropriation according to their relative merits. Such allotments having been made, the States determine the amounts that they can afford to contribute. All arrangements are made under formal agreement, and the following is a statement of the extent of such cooperation during the fiscal year 1908–9 and the character of the work performed.

California.—An agreement in continuation of previous ones with this State was entered into on July 1, 1908, providing that during the fiscal year then beginning cooperative investigations of the flow of rivers in the State should be made, together with the survey of reservoir and dam sites for impounding flood water; the survey of main diversion canals and their headworks for the purposes of development of irrigation, navigation, municipal water supply, and water power; the study of underground waters; and the necessary computations and estimates for all these investigations. The Geological Survey contributed $11,500 and the State $8,500. A similar agreement, covering the same investigations for the year beginning July 1, 1909, has been executed, the two parties thereto contributing $9,000 each.

Colorado.—On July 1, 1908, an agreement was entered into whereby the state engineer of Colorado consented to pay the salaries of observers at 16 stations, the remainder of the expense thereof to be paid by the Survey. The total amount expended by the state engineer during the year was about $750. During the same period the Survey expended approximately $5,000.

Idaho.—A cooperative agreement was entered into with the state engineer of Idaho on April 1, 1909, to continue in effect until June 30, 1910, providing for a determination of the flow of the rivers of the State, together with investigations and observations necessary or

related thereto, for the purpose of development of irrigation, municipal water supply, and water power. The amounts contributed by the two parties are $2,000 each.

Illinois.—During the past year 16 gaging stations have been maintained in Illinois at the expense of the Illinois Improvement Commission. These stations were maintained for the purpose of determining facts necessary to the establishment of an intelligent drainage system throughout the State, and about $1,800 was expended during the year.

Massachusetts.—An agreement to take effect July 1, 1909, with the governor of Massachusetts, under the authority of a law passed by the Commonwealth for that purpose, provided for the determination of the flow of rivers in the State and allied investigations relative to water powers, each party contributing the sum of $1,050.

New York.—Two agreements have been in force in this State. The first is with the state engineer, to whom the legislature grants an annual appropriation of $1,500 for stream-flow measurement work. This is met by a like amount allotted by the Geological Survey. The state appropriation is used to maintain purely intrastate investigations; the allotment of the Survey is expended on interstate streams. The second feature of cooperation involved an agreement with the New York State Water Supply Commission, which allotted from its general appropriation the sum of $2,700 for the maintenance of 11 stations on rivers that were being studied by it.

Maine.—An agreement with the State of Maine involved the expenditure of $2,500 by the Geological Survey and $3,500 by the State, the money being used for the maintenance of gaging stations and the survey of rivers to determine their profiles, for water-power purposes. Sixteen gaging stations were maintained and a survey of the East Branch of Penobscot River was made.

North Carolina.—Under an agreement with the state geologist, the salaries of observers at 12 stations in North Carolina were paid out of state funds.

Maryland.—Under an agreement with the state geologist, the salaries of observers at seven stations in Maryland were paid from state funds.

Minnesota.—An agreement to take effect May 15, 1909, provided for the determination of the flow of rivers, the survey of rivers and reservoir sites, and allied investigations necessary to the determination of the water resources of the State, which was represented by the State Drainage Commission and contributed $12,500, against $2,750 allotted by the Geological Survey; and further provided that on June 30, 1910, a new agreement shall be made, under which the Geological Survey shall contribute to the work as large a sum as is possible under an equitable distribution of the federal

appropriation, due regard being given to the appropriations made by Congress for such work, it being understood that said Survey shall during subsequent years make the allotments necessary to complete the work, which shall eventually equal in the aggregate the contributions made by the State of Minnesota, all being contingent on the action of the Congress of the United States in continuing this feature of the Survey's work.

Nebraska.—An agreement, entered into on July 1, 1908, provided for the maintenance of 30 gaging stations throughout the State, each party contributing the sum of $650.

Oregon.—The agreement with the State of Oregon during the past year was in continuation of similar agreements maintained during several years previous, providing for an expenditure by each party of $2,500 for the determination of the flow of the rivers of the State and investigations and observations necessary for purposes of irrigation, municipal water supply, and water power.

Utah.—An agreement made with the state engineer of Utah, under authority of a special act of the legislature, was entered into on April 1, 1909, and will continue until June 30, 1910. It provides for an expenditure by each party of $2,000 and contemplates the measurement of stream flow and the study of irrigation, municipal water supply, and water-power problems. A similar agreement, informal in character, was made to cover ground-water investigations, and has already been described. (See p. 91.)

Vermont.—Under an act of the legislature of Vermont, the governor was authorized to enter into an agreement with the Director of the Geological Survey for making an investigation and report on the water resources of that State. This agreement was entered into April 1, 1909, and provides for the expenditure of $1,000 by each party.

Washington.—The State of Washington, under authority of the legislature, entered into an agreement with the Director of the Geological Survey on May 1, 1909, for the maintenance of gaging stations and the determination of water powers within the State, each party contributing the sum of $5,000.

PUBLICATIONS.

The following manuscripts are ready for publication or were in preparation at the close of the fiscal year:

SURFACE WATER SUPPLY PAPERS.

No. 234. Conservation of water resources. Reprints from the report of the National Conservation Commission. In press.

Progress Report, 1907–8, in twelve parts: Parts I and III to XI, 78 per cent completed; Part II (No. 242), in press; Part XII, 98 per cent completed.

Hydrography of Penobscot River drainage, 85 per cent completed.

UNDERGROUND-WATER PAPERS.

No. 227. Underground-waters of South Dakota, by N. H. Darton. In press.
No. 232. Underground-water resources of Connecticut, by H. E. Gregory and E. E. Ellis. In press.
No. 233. Underground waters of the Blue Grass region of Kentucky, by G. C. Matson. Submitted.
Underground waters for farm use, by M. L. Fuller. Submitted.
Well-drilling methods, by Isaiah Bowman. Submitted.
Underground-water papers, 1907–8, by M. L. Fuller et al. 85 per cent completed.
Ground waters of north-central Indiana, by S. R. Capps. 95 per cent completed.
Ground waters of eastern Arkansas, by A. F. Crider. Completed and being examined.
Ground waters of Iowa, by Prof. W. H. Norton and Prof. W. S. Hendrixson. 80 per cent completed.
Underground waters of southern Minnesota, by C. W. Hall, O. E. Meinzer, and M. L. Fuller. 90 per cent completed.
Ground waters of southwestern Utah, by O. E. Meinzer. 50 per cent completed.
Geology and water resources of northeastern Texas, by C. H. Gordon. 85 per cent completed.
Ground waters of north-central Texas, by C. H. Gordon. 50 per cent completed.
Geology and underground waters of the coastal plain of Texas, east of Brazos River, by Alexander Deussen. Completed and being examined.
Denudation and erosion in the southern Appalachians, by L. C. Glenn. Returned to author for revision.
Underground waters of southwestern Ohio, by M. L. Fuller. Submitted.
Ground waters of the Mohave Desert, by H. R. Johnson. 60 per cent completed.
California springs, by G. A. Waring. 30 per cent completed.
Geology and water resources of San Luis Valley, Colorado, by C. E. Siebenthal. Returned to author for revision.

PAPERS ON THE QUALITY OF WATER.

No. 236. Surface waters of the United States, Part I, by R. B. Dole. Submitted.
Surface waters of the United States, Part II, by R. B. Dole. 15 per cent completed.
No. 237. The quality of surface waters of California, by Walton Van Winkle. Completed and awaiting revision.
The quality of waters of Kansas, by H. N. Parker. 92 per cent completed.
The quality of waters of Illinois, by W. D. Collins. 90 per cent completed.
The industrial uses of water, by Herman Stabler. 45 per cent completed.
No. 235. The purification of some textile and other factory wastes; a report based on investigations near Providence, R. I., by Herman Stabler and G. H. Pratt. Submitted.
Chemical denudation in the United States, by Bailey Willis, F. W. Clarke, and R. B. Dole, to be published as Professional Paper. 60 per cent completed.

PERSONNEL.

The water-resources branch has continued under the direct administrative charge of M. O. Leighton, chief hydrographer, assisted by J. C. Hoyt, assistant chief hydrographer. W. C. Mendenhall is geol-

ogist in charge of ground-water investigations and R. B. Dole is assistant chemist in charge of investigations of quality of water.

The district engineers in charge of field work of stream gagings, river surveys, etc., are H. K. Barrows, New England; C. C. Covert, New York; R. H. Bolster, middle Atlantic States; M. R. Hall, southern Atlantic and eastern Gulf States; A. H. Horton, Ohio Valley and Central States; Robert Follansbee, Minnesota; J. E. Stewart, Montana, North Dakota, and northern Wyoming; W. B. Freeman, southern Wyoming, Colorado, New Mexico, Kansas, and Nebraska; E. C. La Rue, Utah, Idaho, and Nevada; J. C. Stevens, Oregon and Washington; and W. B. Clapp, California. The computation work is under the charge of R. H. Bolster, assistant engineer.

The geologists engaged in the investigation of ground-water resources, under the direction of W. C. Mendenhall, are H. R. Johnson, G. A. Waring, and O. E. Meinzer.

In addition to these regular employees, occasional services have been rendered by Prof. C. W. Hall, University of Minnesota; Prof. W. H. Norton, Cornell College, Mount Vernon, Iowa; Prof. W. S. Hendrixson, Iowa College, Grinnell, Iowa; and Prof. C. H. Gordon, University of Tennessee, Knoxville, Tenn.

The chemists and engineers who have been engaged in investigations of the quality of water, under the direction of R. B. Dole, are H. N. Parker, Herman Stabler (for part of the year), and Walton Van Winkle.

The débris investigation at the hydraulic laboratory at Berkeley, Cal., has continued under the charge of G. K. Gilbert, assisted by E. C. Murphy.

TECHNOLOGIC BRANCH.

ORGANIZATION AND SCOPE.

The technologic branch of the Survey includes three divisions organized under three separate appropriations—(1) the mine-accidents division, which has for its purpose the protection of the lives of miners in the Territories and in the district of Alaska and the conducting of investigations as to the cause of mine explosions with a view to increasing safety in mining; (2) the fuel division, which has for its purpose the investigation of coals, lignites, and other mineral fuels; and (3) the structural-materials division, which has for its purpose the investigation of structural materials belonging to and for the use of the United States.

The general supervision of the work has remained, as during the previous fiscal year, under J. A. Holmes, expert in charge, and H. M. Wilson, chief engineer.

The technical force of this branch during the fiscal year was as follows: In the mine-accidents division, 6 mining engineers, 5 assist-

ant mining engineers, 1 explosives engineer, 1 electrical engineer, 1 chemist, 5 assistant chemists, and 3 consulting mining engineers employed temporarily as needed; in the fuel division, 9 mechanical engineers, 33 assistant and junior engineers, 5 chemists, 23 assistant chemists, 1 physicist, 2 consulting engineers, and 2 consulting chemists; in the structural-materials division, 4 engineers, 19 assistant and junior engineers, 1 ceramic chemist, 1 assistant ceramic chemist, 1 building-stone expert, 1 chemist, 13 assistant chemists, and 3 consulting engineers employed temporarily as needed.

LABORATORIES AND TESTING FACILITIES.

The scope of the work to be done has rendered necessary the enlargement of the facilities for testing and research; and the interrelations existing between the different lines of investigation authorized by Congress, together with the common need for light, power, and heat, rendered advisable, in the interest of both economy and efficiency, the concentration of the researches at some central station. The fact that at Pittsburg, Pa., and not elsewhere, ample buildings and grounds owned by the Government and not otherwise used were available for such concentration, and the further fact that there was no appropriation available to provide new buildings and grounds for this purpose elsewhere, rendered necessary the establishment of the several testing and investigating laboratories at Pittsburg. Accordingly, and with the approval of the Quartermaster-General of the War Department, the new equipment provided for the investigation of mine explosives was installed under the supervision of J. C. Roberts, assistant chief engineer, in and about seven government buildings on the arsenal tract at Pittsburg, and the equipment of the fuels division which had been in use at Norfolk, Va., during the previous fiscal year was transferred to an adjacent building (No. 13) on the same tract. The chemical work on fuels which had been carried on during the previous fiscal year at the University of California, the Ohio State University, the University of Chicago, and the Carnegie Technical Schools in Pittsburg was, at the beginning of the year, transferred to another special building (No. 21) provided for this purpose on the same tract, and the chemical laboratories for the structural-materials investigations and the investigation of mine explosions and the physical laboratory for fuel investigations were established in other portions of the same building. The equipment for the investigations of clays and clay products under the structural-materials division was installed in and about another building (No. 10) on the arsenal tract, and to this was added certain equipment for other structural-materials investigations, including one 600,000-pound, two 200,000-pound, and one 100,000-pound testing machines, and a variety of other equipment. A 10,000,000-

pound testing machine for testing full-size architectural columns and various engineering materials is now in course of erection.

With these grounds and buildings furnished through the courtesy of the War Department and now well equipped for extensive practical work; with the equipment at St. Louis for the structural-materials investigations connected with the Government's engineering construction and building work in the Mississippi Valley and Western States; and with the smaller special laboratories at Atlantic City, N. J., Northampton, Pa., and Washington, the technologic branch is far better prepared than ever before for conducting in a satisfactory manner the investigations of structural materials, fuels, and mine explosives authorized by Congress.

Under the structural-materials division the investigations of concrete, sands, gravels, stone, and other structural materials at St. Louis were continued in the same buildings and grounds until nearly the end of the fiscal year, when they were temporarily discontinued owing to the necessity of removing from Forest Park the buildings which had been occupied during the last three years for these investigations. Early in June a portion of the equipment was temporarily stored in a building provided by the city of St. Louis, and shortly thereafter it was transferred to a government building in St. Louis under the control of the Corps of Engineers and the Mississippi River Commission. It is expected that the investigations will be continued in this building as soon as adequate funds can be provided. The laboratory for investigating the injurious influence of sea water on concrete and the methods of preventing it was early in the fiscal year transferred from Norfolk, Va., to Atlantic City, N. J., where a suitable and well-located building for this purpose has been leased at a nominal price, and the investigations in this new locality are already under way.

The laboratory for testing cement for use in the construction work of the Panama Canal has during the last four months of the fiscal year been located at Northampton, Pa., where the cement is being manufactured and shipped.

PUBLICATIONS.

During the fiscal year 10 bulletins have been issued, 6 bulletins are in press, and 11 additional bulletins are either in different stages of preparation or have been submitted for publication.

MINE-ACCIDENTS DIVISION.

ORGANIZATION.

The mine-accidents division was organized near the close of the preceding fiscal year under an appropriation approved May 22, 1908.

In addition to the investigations mentioned on pages 14–15, during

April and May, 1909, J. W. Paul, mining engineer, and Axel Larsen, explosives engineer, visited the mine explosives stations and mine rescue stations in England, France, Belgium, Germany, and Austria and made a careful study of the equipment and methods used in investigating mine explosions and in training men in rescue work at mine disasters.

The researches of the mine-accidents division include (*a*) investigations of conditions in mines, under G. S. Rice, chief mining engineer; (*b*) investigations of mine lamps and rescue apparatus for use in mine investigations, under J. W. Paul; (*c*) investigations and physical tests to determine the proper explosives for use in gaseous and dusty mines and the best manner of using such explosives in order to insure safety in mining, under Clarence Hall, explosives engineer; (*d*) investigations and analyses of explosives used in coal mining, under W. O. Snelling, explosives chemist; (*e*) investigations of the conditions under which electricity may be safely used in coal mines where dust or explosive gases are present, under the direction of H. H. Clark, electric engineer; (*f*) investigations of the nature, extent, and distribution of explosive mine gases, under R. T. Chamberlin and N. H. Darton. The primary studies under each of these sections are conducted at the mine experiment station in Pittsburg; but these studies are supplemented by examinations made in selected mines in the important coal fields.

The mine-accidents division also conducts the inspection of coal mines in the Territories, which during the fiscal year was limited to New Mexico. This work was under J. E. Sheridan, mine inspector, who after the latter part of January was assisted by J. W. Groves, assistant mining engineer.

G. S. Rice, assisted by A. C. Ramsey and R. Y. Williams, assistant mining engineers, during the year examined a number of mines in Pennsylvania, West Virginia, Ohio, and Illinois, where explosions or mine fires have occurred, and investigated the influence of moisture from sprinkling or steam, etc., as a means of preventing dust explosions in mines. In this work Mr. Rice was joined by J. W. Groves in January, 1909; J. J. Rutledge in March, 1909; and H. M. Wolflin June 6, 1909.

J. W. Paul, assisted by F. F. Morris, F. W. Horton, and L. N. Jones, assistant mining engineers, has conducted investigations into the different systems of lighting mines and the efficiency of different types of rescue apparatus for use in entering mines filled with poisonous gases, and supervised the training of practical miners to use the rescue apparatus with a view to assisting in these investigations in the different coal fields. One day of each week was devoted to giving public demonstrations of the use of the rescue apparatus and of

the training in its use of miners sent in for this purpose from the different mining regions.

As soon as the appropriation for this work became available, the necessary equipment for the investigation of explosives used in coal mining was ordered, and much of this was in place and ready for use at the beginning of the fiscal year. Clarence Hall, explosives engineer, with S. P. Howell, assistant engineer, and E. L. Stenger and A. B. Coates, junior engineers, conducted during the first six months of the year the preliminary tests of explosives with a view to training men in the adjustment of the equipment connected with the large testing gallery. This work was supplemented by tests by C. H. Cordie, assistant chemist, and H. M. Wolflin and F. F. Morris, assistant engineers, concerning the various physical properties of explosives. The chemical analysis of explosives and of the gases resulting from explosions of natural gas, coal dust, and other materials used in conducting the investigations was carried on throughout the fiscal year under W. O. Snelling, assistant chemist, in charge, aided by C. G. Storm, A. L. Hyde, H. Schlatter, W. C. Cope, and G. A. Burrell.

Early in the fiscal year the general equipment of the Pittsburg station was increased by a portion of the apparatus needed for the investigations into the uses of electricity in mining and its relations to mine explosions, and certain investigations into this subject were begun. The electric engineer in charge of these investigations, H. H. Clark, was appointed April 1, and continued in service through the remainder of the fiscal year. He has been assisted by L. M. Jones, junior engineer, and G. R. Wood, consulting engineer.

R. Y. Williams, assistant mining engineer, was during March, April, May, and June stationed at Urbana, Ill., in charge of a mine rescue station established there under a cooperative arrangement between the Illinois State Geological Survey, the University of Illinois, and the United States Geological Survey. During April, May, and June A. C. Ramsey was stationed at Birmingham, Ala., for the special purpose of investigating the causes of mine explosions in that region and the best methods of preventing them.

RESULTS OF INVESTIGATIONS.

Among the results of this work may be mentioned the establishment of a well-equipped laboratory and testing station at which there have been made during the fiscal year more than 1,000 chemical analyses of explosives used in mining, and of natural gas, coal dust, and various explosion products, and nearly 5,000 physical tests of explosives in the gas and dust galleries; a large number and variety of mine lamps have been examined; and experiments have been made with a number of different types of mine rescue apparatus. Some 40

inspection trips have been made to explosives manufacturing plants with a view to investigating the different types of explosives used in mining.

In January, 1909, the manufacturers of explosives used in coal mines were invited to bring to the testing station at Pittsburg such explosives as they desired to have tested with a view to their use in mines where explosive gases and inflammable dust were known to occur under conditions indicative of danger. In response to this invitation 28 requests were received for the testing of 61 explosives, of which, up to the end of the fiscal year, 31 have been tested. Of these, 18 have passed all the tests satisfactorily and have been placed on what is designated the "permissible list" of explosives for use in such mines. On May 15 a circular (No. 1) was distributed to persons interested in coal mining, giving the names of the 17 explosives which at that date had passed all the tests and had been placed on the permissible list.

The engineering force for the investigation of mine conditions in relation to explosions has during the year visited 54 mines, representative of the several important coal fields—especially the mines which were considered dangerous owing to the presence of gas and dust and in which either mine explosions or mine fires occurred. At 14 of these explosions had occurred and at a number of others fires were raging which could not be easily extinguished except through the use of the special breathing apparatus with which these mining engineers were equipped.

Many tests have been made as to the type of lamps and of electric equipment of various kinds which may or may not be used safely in mines containing gas or inflammable dust under conditions likely to cause mine explosions.

The value of moisture in coal dust in preventing dust explosions in mines has been demonstrated in a series of laboratory investigations, which it has been arranged to supplement by tests made underground with actual mining conditions. Another series of investigations has demonstrated the conditions under which the use of improper explosives and the improper use of any explosive may cause a dust or gas explosion. The use of a small coal mine has been obtained in which it has been arranged to conduct a series of experiments concerning the influence of moisture and explosives in causing mine explosions, thus repeating under actual mine conditions the experiments conducted in the laboratory.

FUEL DIVISION.

ORGANIZATION.

The organization of the fuel division is practically the same as during the preceding fiscal year. Its work comprises the analyzing

and testing of the fuels belonging to or for the use of the United States and general investigations with a view to the increased efficiency or the prevention of waste in the mining and use of coal and other mineral-fuel substances. The equipment was practically the same as that used during the investigations of the preceding year at Norfolk, Va., except that a 250-horsepower Taylor producer and a 250-horsepower vertical three-cylinder Westinghouse gas engine, used at Norfolk, were replaced by a 150-horsepower Loomis-Pettibone producer and a 150-horsepower vertical three-cylinder Westinghouse gas engine; with this equipment was installed in government building No. 17 on the arsenal tract at Pittsburg a special combustion chamber 40 feet long with a 150-horsepower mechanical stoker, attached to one of the 220-horsepower Heine boilers, with a view to conducting special investigations into combustion problems.

In the chemical section N. W. Lord continued to serve as consulting chemist, with general supervision over all chemical work. The work of the laboratory in making general coal analyses remained under the immediate supervision of F. M. Stanton, chemist, assisted by A. C. Fieldner, G. A. Burrell, I. H. Bower, D. I. Brown, E. M. Dawson, jr., W. W. Karnan, B. G. Macintire, C. J. Monahan, J. A. Scherrer, R. E. Vennum, Perry Barker, and W. E. Surbled, assistant chemists. The routine work of the section included the determination of the heat value and chemical composition of samples of coal collected from public lands throughout the West.

H. C. Porter, assisted by F. K. Ovitz, continued during the year the special chemical investigations concerning the nature of the gases given off in the distillation of typical coals at different temperatures, the character and fuel value of the volatile matter given off from these coals, and the nature and possible prevention of spontaneous combustion of coals.

J. C. W. Frazer continued his special laboratory researches into the chemistry of the combustion of coals in the different types of furnaces used in government heating and power plants and into the methods of dissolving the hydrocarbons in coal, with a view to their complete chemical analysis.

I. C. Allen, assisted by C. C. Draper and W. A. Jacobs, has continued during the year his chemical and physical examinations into the character and fuel value of the different varieties of crude petroleum, concerning which information was desired by the Navy, Treasury, and Interior Departments.

J. K. Clement, assisted by L. K. Adams, cooperated with Doctor Frazer and Henry Kreisinger in the investigation of special combustion problems, and also assisted W. T. Ray in certain boiler-furnace investigations, C. L. Wright in certain briquetting investigations, and R. L. Humphrey in certain structural-materials investigations.

The fuel-efficiency investigations in connection with heating and power plants of the Government, with a view to determining the fuels best adapted for use for these purposes in different parts of the country and the methods by which they may be used most efficiently by the Government, were conducted under the advisory supervision of R. H. Fernald, L. P. Breckenridge, and W. F. M. Goss, by D. T. Randall, H. W. Weeks, S. B. Flagg, Henry Kreisinger, W. T. Ray, and the assistant engineers.

Special lines of investigation were followed under this section in connection with the testing of fuels under boiler furnaces, such as are used in government power and heating plants, under D. T. Randall, H. W. Weeks, and S. B. Flagg; the investigation of gas fuels under producer furnaces as to their adaptability for naval purposes and for utilizing the low-grade bituminous coals and lignites, such as are found on the public lands, under the supervision of R. H. Fernald, assisted by C. D. Smith, D. F. Smith, L. Stone, and F. E. Woodman; the investigation of fuel oils as to their chemical and physical properties, with a view to determining the most efficient methods of use, under I. C. Allen, and as to their availability for use in fuel engines, under R. M. Strong; the investigation of combustion problems with reference to furnaces for government heating and power plants, under Henry Kreisinger, W. T. Ray, J. C. W. Frazer, and J. K. Clement; investigations into the briquetting, coking, and washing properties of coal, under A. W. Belden and G. R. Delamater at Denver, Colo., July to December, 1908, inclusive, and under C. L. Wright at Pittsburg, January to June, 1909; and heat-propagation investigations under W. T. Ray and Henry Kreisinger.

In connection with the investigation of fuels for the War Department, the small boiler and equipment which for several years has been in use in that department under the direction of the Quartermaster-General of the Army near Washington was early in May shipped to the Pittsburg station, and at the same time the assistant engineer in charge, A. S. Rowe, was transferred to the Survey to continue in charge of this plant, which will hereafter be operated as part of the equipment of the technologic branch.

W. T. Ray has devoted his attention largely to experiments connected with heat transmission in furnaces such as are used by the Government for power and heating purposes. Charles L. Wright during the latter half of the fiscal year continued experiments looking to the briquetting of lignites without the use of external binding materials, and succeeded in making briquets of lignites from four different localities in the Western States. Otto Lehman, of Magdeburg, Germany, was employed during the months of April and May to aid in the installation and operation of the large German briquetting machine.

A. W. Belden and G. R. Delamater continued washing and coking investigations at Denver and the preparation of a report on them until February. At that time Mr. Delamater resigned and Mr. Belden was transferred to the Pittsburg plant, where he cooperated with Mr. Wright in the lignite-briquet investigation.

The inspection of fuels used by the Government was under the supervision of J. S. Burrows from the beginning of the year to March 16, and subsequently under G. S. Pope. It embraced the drawing up of specifications for use in the purchase of coal used by the Government in its heating and power plants in the city of Washington and elsewhere, and the sampling and testing of fuels delivered to the Government in different parts of the country. Mr. Burrows and Mr. Pope were assisted in this work by P. M. Riefkin, N. H. Snyder, E. W. Miller, L. Loeb, A. A. Straub, and F. J. Simington, assistant engineers, and J. W. Peters, junior chemist. The samples of coals collected by the inspecting force or sent in from different parts of the country by local representatives of the Government were analyzed in the Washington laboratory under S. S. Voorhees, aided by G. O. Spitler and J. D. Davis, chemists, and H. M. Cooper, J. S. McCune (after Nov. 4, 1908), A. C. Cooper (after Dec. 20, 1908), W. J. Buttner (after Feb. 9, 1909), Wood Freeman (after Mar. 11), J. A. Scherrer (after May 17), and H. G. Elledge (after June 21), assistants.

FIELD INVESTIGATIONS.

The field work of the fuel division during the fiscal year consisted of investigations into the chemical and microscopic structure of coal, with reference to its origin and its coking qualities, conducted by David White, assisted by Rhinehard Thiessen; field investigations into the character and distribution of peats and certain lignitic coals, conducted by C. A. Davis; and the inspection of coals in connection with government purchases, conducted by Messrs. Burrows, Pope, and Rice, and other mining engineers.

RESULTS OF INVESTIGATIONS.

Among the results of the fuel investigations conducted during this and the preceding fiscal year is the fact that the purchase of nearly half the coal used by the Government is based on some form of specifications prepared by the technologic branch of the Survey. During the present year 3,299 samples of coal have been collected, 19,727 chemical and calorimeter determinations have been made, and more than 100 mines have been examined with a view to determining the possibility of obtaining coal deliveries in accordance with proposed contracts. For the government coals purchased without definite specifications the fuel division is making, at the request of different

branches of the government service, examinations of the mines from which it is expected that this coal will be delivered, and also from time to time chemical analyses and calorimeter tests of the coal delivered, with a view to determining whether or not the deliveries are in accordance with the contracts under which the purchases are made.

The special chemical investigations have made known the character and value of the coal underlying several million acres of public land, have thrown light on the properties of coal and processes of combustion, and will aid in rendering possible increased efficiencies in the burning of coal. The investigations at Denver have shown the possibilities of making commercial coke for metallurgical purposes from the coal of a number of coal fields which were not heretofore believed to yield coking coal, and have indicated how the quality of this coke may be decidedly improved through washing processes. The briquetting investigations have demonstrated the possibility of making commercial briquets from lignites collected at two localities in Montana, one in California, and one in Texas.

In connection with the producer investigations during the latter half of the fiscal year 15 tests have been made, ranging from sixty to one hundred and thirty-nine hours each, involving nearly 40,000 observations. In the investigations of the use of fuel oils for power purposes 234 tests were made, involving some 2,500 observations. Under the investigations into fuel efficiency for government heating and power plants 60 tests have been made, involving 31,500 observations, the tests relating primarily to coals for use by the Quartermaster's Department of the Army.

F. M. Stanton and his assistants at the Pittsburg laboratory analyzed 1,365 samples of coal, involving more than 20,000 determinations. These samples were forwarded from different departments of the Government and to a large extent collected from the public land.

In the investigation of the coals from the public lands in the Rocky Mountain region during the first half of the fiscal year 69 coking tests, 49 washery tests, and 532 chemical analyses were made, involving 3,253 calorimeter and other determinations.

The total cost of these investigations is but a small percentage of the aggregate financial value of these results to the Government itself, through increase in value of its coal lands and through greater economy in purchasing and greater efficiency in using fuels.

STRUCTURAL-MATERIALS DIVISION.

ORGANIZATION.

Investigations under the structural-materials division during the fiscal year had a double purpose—(*a*) to determine the nature and extent of and the most efficient methods of utilizing the structural

materials belonging to and for the use of the Government of the United States; (*b*) to investigate such materials with a view to determining their suitability for the special purposes for which their use is proposed in the building and engineering construction work of the Government. The organization of this work was much the same as during the preceding year, with the addition of the clay-products section. Investigations were conducted during the year not only at the central experiment station at Pittsburg and the structural-materials laboratory at St. Louis, but also at the special laboratories at Atlantic City, N. J., Northampton, Pa., and Washington.

Under the immediate direction of R. L. Humphrey investigations in concrete and reinforced concrete were continued by L. H. Losse, with the aid of five assistant engineers and skilled laborers at the St. Louis laboratory in Forest Park; investigations into the fire-resisting properties of structural materials were continued by E. B. Tolsted at Chicago and later at Pittsburg, and investigations into the behavior of reinforced concrete beams under static loads were made by Mr. Tolsted at Pittsburg during May and June.

The chemical researches associated with structural-materials investigations were conducted by P. H. Bates, assisted by A. J. Phillips, at Pittsburg, and by S. S. Voorhees, with J. S. Miller, L. M. Law, A. C. Nothstine, and W. Freeman, assistant chemists, in the laboratory at Washington.

Investigation of clays and clay products for use in government buildings and engineering construction work were conducted in the structural-materials laboratory at Pittsburg by A. V. Bleininger, assisted by H. E. Ashley, G. H. Brown, and E. Thomas. Mr. Bleininger has also supervised the investigation of lime for use in government buildings, in which he was assisted by W. E. Emley.

The field investigations of stone, sand, gravel, and associated structural materials available for use in the construction of government buildings and other public works were carried on by E. F. Burchard at intervals throughout the larger part of the year, and by N. H. Darton in the Middle and South Atlantic States during April, May, and June. These investigations have been made at the special request of the Secretary of the Treasury for the Supervising Architect, with a view to determining the nature and extent of the structural materials for use in more than 300 public buildings provided for by Congress during the last two years. For a number of public buildings these materials have been carefully examined in the field, and samples of the different types of sand, gravel, crushed stone, clay products, etc., available for use in the construction of these buildings have been forwarded to the laboratories at St. Louis and Pittsburg, where they have been carefully tested as to their suitability for such use.

The investigations into the behavior of concrete exposed to water and into the methods of counteracting the injurious influence, which were undertaken at the request of the War and Navy departments, have been conducted at the marine structural-materials laboratory at Atlantic City, N. J., by R. J. Wig, under the supervision of Mr. Humphrey. Investigations as to the causes and methods of preventing injuries to concrete from alkaline waters in the arid States are being carried on at the Pittsburg station.

The testing of cement shipped to Panama was done in the well-equipped laboratory at Northampton, Pa., where the cement is being manufactured. W. A. Campbell, with six assistants, was in charge of the work. Investigations conducted at the Washington laboratory related to the structural materials purchased for use by the several branches of the government service in Washington, especially the cement and other structural materials purchased for use by the Supervising Architect in the construction and repairs of government buildings. The laboratory formerly maintained by the Supervising Architect for testing materials purchased for use in the construction and maintenance of public buildings was transferred from the Treasury Department to the Department of the Interior in November, 1908. This laboratory was associated with the Washington laboratory of the technologic branch and S. S. Voorhees, as engineer of tests, was placed in charge of both.

RESULTS OF INVESTIGATIONS.

Among the results of the structural-materials investigations during the fiscal year may be mentioned the making of nearly 6,000 and the testing of nearly 4,000 forms of constituent materials (sands, gravels, stone, etc.); the making of more than 400 and the testing of more than 700 beams; and the making of 78 and the testing of 54 samples of steam-cured forms, mainly for the Supervising Architect and for the Quartermaster-General and Chief of Engineers of the Army.

In addition to the above, analyses have been made of 630 different samples of structural materials, involving nearly 9,000 chemical determinations. In the testing of cement shipped from Northampton, Pa., for the Isthmian Canal Commission 2,207 determinations were made, including the time of set, specific gravity, fineness, etc., and at the close of the fiscal year the testing of this cement was proceeding at the rate of 2,000 barrels a day. In connection with the testing of structural materials for departmental purchases in the District of Columbia nearly 3,000 samples were received for analysis, involving nearly 33,500 chemical determinations and tests. A number of miscellaneous investigations have been carried on during the year at the request of the Supervising Architect's office, Isthmian Canal Commission, Corps of Engineers of the Army, Bureau of Yards and

Docks of the Navy, and Reclamation Service relative to the waterproofing of concrete and other engineering structures; the reinforcing and protection of concrete; the relative strength and durability of columns of concrete, brick, terra cotta, and other structural materials; the behavior of clays and clay products under different conditions; and the fire-resisting qualities of different structural materials.

PUBLICATION BRANCH.

BOOK-PUBLICATION DIVISION.

SECTION OF TEXTS.

The publications of the year consisted of 1 annual report, 6 professional papers, 36 bulletins (one of which was also published in 3 separate chapters), and 12 advance chapters from one other bulletin, 12 water-supply papers, 1 annual report on mineral resources for 1907 (also published in 50 chapters), 6 advance chapters from the annual report on mineral resources for 1908, and 7 geologic folios. These publications were the Twenty-ninth Annual Report; Professional Papers 58 to 63; Bulletins 340, 341, 345 to 359, 361 to 376, 378, 379, 12 separates from 380, and 385; Water-Supply Papers 219 to 226 and 228 to 231; Mineral Resources for 1907 (volume and 50 separate pamphlets) and 6 separate chapters from Mineral Resources for 1908; Geologic Atlas, folios 160 to 166. Summaries of these publications are given on pages 17–28 of this report. They comprise 10,180 pages, those of the last fiscal year covering 10,149 pages. In addition to the publications of the regular classes a "Handbook for field geologists," a revised edition of "Geographic tables and formulas" (formerly issued as Bulletin 234), a pamphlet of "Suggestions to authors of papers submitted for publication by the United States Geological Survey, with directions to typewriters," and many miscellaneous circulars and pamphlets, most of them relating to administration, were published.

During the year 19,775 pages of manuscript were prepared for printing, and proof sheets for 11,840 final printed pages were read and corrected, this work involving the handling of 4,139 galley and 23,748 page proofs. The corresponding figures for last year were 20,691 pages of manuscript, 10,827 final printed pages, 4,479 galley proofs, and 16,140 page proofs.

The make-up was prepared for 538 plates, the proofs of which were also read, as against 369 plates so prepared last year.

Indexes were prepared for 47 publications, covering 9,730 pages, the corresponding figures for last year being 39 publications and 7,538 pages.

George M. Wood, editor, has charge of the work of this section, and 5 other persons have been employed during the year. Material assistance has been rendered at different times in the work of the section of distribution.

SECTION OF ILLUSTRATIONS.

During the year 5,171 illustrations were prepared for 41 bulletins, 14 water-supply papers, 5 professional papers, 2 reports on mineral resources, and 1 annual report. These illustrations included 181 maps, 956 diagrams, 3,222 paleontologic drawings, 629 photographs retouched, and 183 miscellaneous.

Proofs to the number of 1,745 were received and compared critically, and an examination was made of the printed editions of all illustrations furnished by contract during the year, as heretofore.

During the year 109 electrotypes were furnished to outside applicants, as compared with 182 furnished last year.

The committee on illustrations rejected 149 illustrations submitted with manuscripts offered for publication.

At the close of the year material for the illustration of 27 reports is in hand.

At present the personnel consists of 4 geologic draftsmen, 3 paleontologic draftsmen, 1 classified laborer, and the draftsman in charge.

SECTION OF GEOLOGIC MAPS.

During the year a change in the form of the geologic folio has been made to meet the demand of the practical user of the maps in the field. In addition to the large folio form, which is inconvenient to carry about, a field edition of octavo size with folded maps in a pocket will hereafter be published for all, and the last three folios published during the fiscal year appear in this form as well as in the other.

Besides the preparation of folios for publication and reading proof, the section of geologic maps has been engaged in the preparation of the geologic map of North America and other geologic data for publication in reports other than folios of the geologic atlas.

Of the 10 folios in hand July 1, 1908, seven were published during the fiscal year (see pp. 27–28) and the three others—Trenton (N. J.-Pa.), Mercersburg-Chambersburg (Pa.), and Watkins Glen-Catatonk (N. Y.)—are very nearly completed. The Jamestown-Tower (N. Dak.), Warren (Pa.), Engineer Mountain (Colo.), Sewickley (Pa.), and Johnstown (Pa.) folios, which were transmitted to the section during the year, are in course of publication.

SECTION OF TOPOGRAPHIC MAPS.

A year ago the editor of topographic maps reported 54 new topographic atlas sheets and special maps which had not yet been put into

the hands of the engravers and 37 in process of engraving. The corresponding figures on June 30, 1909, were 76 and 59. The accessions during the year numbered 103 maps; 85 maps were published.

The manuscripts edited, including verification or correction of all geographic names, comprise 83 new atlas sheets and special maps; corrections for 224 sheets hitherto published; and 214 map illustrations which are or will be included in 35 volumes of Geological Survey reports. The proof read comprises 78 new atlas sheets and special maps and corrections to 66 maps.

Compilations were made for a revision of the western half of the large United States base map to provide a base for a map of the mining districts of the western United States, published in Mineral Resources, 1907. Additional material was compiled for the base "Carte géologique de l'Amérique du Nord." For the Department of the Interior, three administrative maps—"Yosemite National Park," "Sequoia and General Grant National Parks, Cal.," and "Platt National Park, Okla."—were prepared. The first two, being made up of extracts from Geological Survey atlas sheets, were prepared and proof read in this section; the last—surveyed, engraved, and printed by the Geological Survey—received the same attention in the way of editing and proof reading as any Survey map.

Five men were engaged in the work of this section during the entire year.

SECTION OF DISTRIBUTION.

The section of distribution received during the year 127 new books, 7 new folios, 85 new maps, and 204 reprints of maps, a total of 423; the totals of all editions were 360,472 books, 34,971 folios, and 773,607 maps; grand total 1,169,050. During the year 360,616 books, 39,170 folios, and 597,361 maps (including 444,230 sold), a total of 997,147, were distributed.

The total amount received and turned into the Treasury as a result of sales of publications was $19,899.28, an increase of $2,885.72 over the amount received during the year 1907–8.

During the year 79,315 letters were received, answered, and filed, an increase of 2,645 over the number in the preceding year.

DIVISION OF ENGRAVING AND PRINTING.

MAPS, FOLIOS, AND ILLUSTRATIONS.

At the beginning of the year 117 atlas sheets and special maps were on hand for publication and the accessions during the year were 103 maps. The status of these 220 maps on June 30, 1909, was as follows:

Published during the year	85
In process of engraving	59
Not taken up	76

Besides the engraving of new maps, corrections were made on the plates of 228 maps hitherto published. Editions of 289 maps were printed and delivered to the map room, including new maps and reprints or new editions.

Seven geologic folios were published and 34,971 copies were printed. Eight other geologic folios had been partly completed at the close of the year.

Under contracts with the Government Printing Office, map illustrations were printed for the following Survey publications: Bulletins 349, 351, 356, 358, 360, 364, 371, 374; Water-Supply Papers 220, 221, 222, 224, 225, 231; Mineral Resources, 1907. For the Government Printing Office, also, maps of 13 bird reservations, 2 national monuments, 8 national forests, and some odd items were printed and delivered; for the Forest Service, maps of 54 national forests, the "Forest Service Atlas" for 1907, the "Forest Atlas legend plate," and a map of the United States showing all the national forests; for the General Land Office, 1,091 township plats; for the Department of the Interior, maps of three national parks and a number of maps for exhibition at the Alaska-Yukon-Pacific Exposition; for the Reclamation Service, a large amount of miscellaneous work. Work was also done for the War Department, the Cuban Government, the Weather Bureau, the Bureau of Standards, the Isthmian Canal Commission, the Bureau of Education, the Office of Indian Affairs, the Civil Service Commission, and the Biological Survey. This work for other branches of the Government amounted to about $45,000, for which the division was reimbursed by transfer of credit on the books of the United States Treasury.

Of miscellaneous matter of all kinds the total number of copies printed was nearly a million and a third and required nearly three and one-half million printings. The total number of copies printed of maps, folios, and miscellaneous matter was 2,123,973, requiring over eight and one-half million impressions. On requisition of the Government Printing Office, 212 transfer impressions were made and shipped to contracting printers.

INSTRUMENT SHOP.

The work of the instrument shop consisted in overhauling and repairing surveying, drafting, and engraving instruments and in making copperplates and electrotypes. More than 2,700 repairs were made to instruments and 258 new copperplates and 37 electrotypes were finished.

PHOTOGRAPHIC LABORATORY.

The output of the laboratory included 18,199 negatives, of which 3,172 were wet, 1,148 paper, and 13,879 dry; 38,935 prints, of which

12,270 were chloride prints, 692 bromides, and 25,973 prints for illustrations; and 1,147 lantern slides made and 131 colored.

ADMINISTRATIVE BRANCH.

EXECUTIVE DIVISION.

Correspondence, records, appointments, supplies, and shipments.—The work of this section was considerably heavier during 1908–9 than in the preceding year, as shown by the figures given below. The general character and scope of the work and the routine of carrying it out have been the same, with the exception of an important change in the work of the appointment desk. In compliance with the department order of January 15, 1909, all papers in connection with the personnel are prepared in this section. This change not only involves the preparation of all appointment papers in this office, but it allows direct communication with the Civil Service Commission in all matters preliminary to appointments. It also puts upon this section the duty of preparing reports to the Treasury, through the disbursing clerk, of all changes in the personnel affecting pay, and also the preparation of reports to the Civil Service Commission each month of all changes in the personnel. While these changes have all served to expedite the accomplishment of results, they have added very much to the work of the section. This condition has been recognized by the Department, and it has detailed a clerk expert in appointment matters to assist in the work.

Mails, files, and records.—During the year 121,351 pieces of incoming mail were handled in this section, a gain of more than 13 per cent over the preceding fiscal year. The increase in 1908 over 1907 was but 2 per cent. Of this mail, 25,258 pieces, an increase of 25 per cent over the number for 1908, contained remittances for publications of the Survey. The amount of money received in this mail was $22,546.33.

The recording, referring, and filing of correspondence required most of the services of four clerks throughout the greater part of the year. The number of letters mailed through the section was 91,450, of which 17,333 were registered. This is an increase of about 37 per cent over 1908 in the total number of pieces mailed and practically the same in the outgoing registered mail.

Personnel.—The roll of those holding Secretary's appointments numbered at the close of the fiscal year 955 persons, an increase of 115, or 14 per cent, over the preceding year. In this roll 1,322 changes, including appointments, separations, promotions, and changes of status of every kind, were made during the year, which was an increase over the preceding year of nearly 45 per cent and is more than in any previous year in the Survey's history. Of these

changes 390 were new appointments, an increase of 16 per cent; 275 were separations (including 6 caused by death); 432 were promotions; and 3 were reductions. The remaining changes included extensions of limited appointments, changes in titles or in the basis of payment, the designation of disbursing agents, and such other minor changes as neither increased nor decreased the total number of persons.

In the foregoing no account is taken of the cases of temporary employment based on authorization from the Civil Service Commission. In this class of cases there is no Secretarial appointment, the work being essentially correspondence, with a temporary record of the particulars of the case.

During the year 13,890 days of annual leave and 2,763 days of sick leave were granted, being 49 per cent of the amount of annual leave and 10 per cent of the amount of sick leave which it is permissible to grant under the law; also 6,866 days of leave without pay. In addition to the above there were also 134 transfers to state pay rolls, in cooperative work.

Property accountability.—During the year the system of property accountability by custodians for various branches and divisions was continued and, in addition, a custodian of office property was designated to make an inventory of all nonexpendable property in Washington. This inventory was completed, and a list of the office property submitted to the Department near the close of the calendar year 1908.

Express and freight.—During the year 3,313 pieces of freight and express were handled by the shipping clerk, of which 1,109 were outgoing and 2,204 were incoming; 716 freight and express accounts were examined and checked. This is a decrease of 30 per cent in the number of pieces handled, but an increase in the number of accounts handled.

Purchase and distribution of supplies.—The system of employing a general purchasing clerk to look after the details of all purchases made in Washington, established during the previous year, was continued and is working satisfactorily. The work of procuring bids, issuing orders, and preparing vouchers required the services of three persons during the entire year. The number of requisitions handled during the year was 2,847, an increase of 28 per cent over the preceding year. The number of orders drawn was slightly less and the number of vouchers passed considerably more than in the preceding year.

Stationery.—In the stationery room the services of three men are required for handling mails, delivering supplies throughout the office and packing and shipping them to the field parties, and keeping an account of the charges for stationery supplies. During the year

9,043 requisitions for blanks, blank books, and miscellaneous supplies were filled from stock on hand and 442 requisitions were drawn on the Department for supplies. In addition to this work 677 requisitions for printing were made on the Department and 424 requisitions for furniture and supplies. These figures are, with one exception, slightly larger than for the previous year. The practice of limiting the dates on which requisitions may be forwarded has reduced the number of requisitions since the order went into effect, which accounts for the apparently small increase in this phase of the work in the stationery room.

Administrative bookkeeper.—Throughout the year the administrative bookkeeper continued to handle all Survey transactions of an administrative character and to examine, check, and record such items as related solely to the administrative branch. He acted in an advisory capacity with respect to accounting methods of the branch, passed on all requisitions for supplies to be procured from the Department of the Interior, determined the amount payable therefor from Survey appropriations, and arranged and submitted for settlement the accounts covering charges arising for these purposes.

The following table shows the classified net disbursements by the Survey for the fiscal year 1909, the repayments shown in the table on page 119 having been deducted:

Classification of expenditures by the United States Geological Survey for account of the fiscal year ending June 30, 1909.

Appropriation.	Total.	Salaries and wages.	Traveling expenses.	Rent, electric light, and motive power.	Office furniture and fixtures.	Stationery supplies.	Library.	Transportation of property.	Instruments.	Telegrams and telephone service.
Salaries, statutory	$64,505.62	$64,505.62								
Skilled laborers, etc	19,794.32	19,794.32								
Gaging streams, etc	99,545.94	77,654.53	$9,838.62	$1,629.82	$922.31	$1,004.17		$575.55	$1,913.03	$266.11
Paleontologic researches	9,989.75	9,293.40	333.09	5.35	74.58	37.45		9.00	8.55	19.27
Chemical and physical researches	19,497.93	17,566.87	.70	87.94	223.45	63.40		14.45	2.25	
Preparation of illustrations	18,066.75	16,664.04	2.80	2.52	85.50	87.34				6.68
Mineral resources of the United States	74,507.27	63,458.53	3,761.46	532.87	1,860.00	1,566.99	$2.70	105.28	281.72	489.13
Books for the library	1,396.84						1,375.47	21.37		
Topographic surveys	296,338.31	187,239.08	23,714.50	211.98	559.30	3,891.56	4.40	4,796.77	2,875.64	510.74
Geologic surveys	199,340.58	157,128.66	13,658.94	136.05	2,285.58	1,519.13	9.75	1,499.35	1,423.89	210.31
Mineral resources of Alaska	79,418.87	42,722.58	14,228.61	5.05	216.77	663.91		4,849.13	867.55	89.33
Geologic maps of the United States	87,188.83	59,823.31	66.50	1,907.42	395.26	240.10		124.14		87.71
Surveying forest reserves	74,517.88	61,089.12	1,949.94	25.45	122.32	376.16		150.11	82.42	12.00
Testing fuel	246,914.87	164,860.86	9,160.59	2,514.70	2,323.77	1,306.68	105.60	4,651.51	63.30	407.89
Testing structural materials	78,255.79	46,181.44	2,712.63	358.13	455.84	456.74	79.63	1,164.32	10.92	94.30
Inspecting mines in territories	3,185.98	2,000.00	809.02							.55
Investigating mine accidents	148,226.90	34,185.68	4,293.97	193.63	2,193.72	714.10	50.61	1,045.82	493.62	296.24
Improving and safeguarding electric wiring	1,999.53	915.67			1,083.86					
Replacing articles destroyed by fire	14,309.22	1,283.00	259.73		4,266.03	466.46		5.75	6,013.18	
	1,537,001.18	1,026,366.71	84,791.10	7,610.91	17,068.29	12,394.19	1,628.21	19,012.55	14,036.07	2,490.26

Appropriation.	Camp outfit.	Subsistence.	Forage.	Photographic material.	Engraving and printing material.	Chemical and physical laboratory material.	Drawing material.	Control material.	Erection of testing plants.	Operation of testing plants.
Salaries, statutory										
Skilled laborers, etc										
Gaging streams, etc	$777.04	$3,386.28	$638.87	$649.27		$283.60	$6.74			
Paleontologic researches	13.50	3.00	10.45	127.32		54.79				
Chemical and physical researches				9.40		1,529.47				
Preparation of illustrations				962.85			255.02			
Mineral resources of the United States	6.35	1,448.00	6.50	372.72		614.01	1.01			
Books for the library										
Topographic surveys	6,616.11	44,870.06	15,834.74	2,723.78		28.88	309.15	$2,151.62		
Geologic surveys	3,064.93	9,637.25	2,615.77	5,149.37		731.63	269.97			
Mineral resources of Alaska	6,107.41	7,589.41	1,100.78	740.67		114.85	105.87	16.95		
Geologic maps of the United States		20.10			$24,524.29					
Surveying forest reserves	2,165.31	2,980.20	3,087.77	2,266.12		6.03	91.72	113.21		

Classification of expenditures by the United States Geological Survey for account of the fiscal year ending June 30, 1909—Continued.

Appropriation.	Camp outfit.	Subsistence.	Forage.	Photographic material.	Engraving and printing material.	Chemical and physical laboratory material.	Drawing material.	Control material.	Erection of testing plants.	Operation of testing plants.
Testing fuel	$120.75	$5,779.71	$164.63	$616.16	.....	$10,902.81	$51.95	.....	$35,802.18	$8,081.78
Testing structural material	2.25	1,442.00	.50	106.90	.....	6,064.65	20.80	.....	16,978.92	2,125.77
Inspecting mines in the Territories	.....	375.71	.70	.....	.....	.....	.....	.....	.....	.....
Investigating mine accidents	16.65	2,381.36	.....	465.00	.....	8,965.35	125.06	.....	88,785.14	4,020.95
Improving and safeguarding electric wiring	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Replacing articles destroyed by fire	76.55	95.20	18.00	5.75	.....	1,634.05	89.89	$95.63	.....	.....
	18,966.85	80,008.28	23,478.71	14,195.31	$24,524.29	30,930.12	1,327.18	2,377.41	141,566.24	14,228.50

DIVISION OF DISBURSEMENTS AND ACCOUNTS.

A condensed statement covering the financial transactions of the fiscal year is given below.

Amounts appropriated for and expended by the United States Geological Survey for the fiscal year ended June 30, 1909.

Title of appropriation.	Appropriation.	Repayments.	Available.	Disbursements.	Balance.
Salaries, office of the Director	$35,340.00	.....	$35,340.00	$34,772.34	$567.66
Salaries, scientific assistants	29,900.00	.....	29,900.00	29,733.28	166.72
Skilled laborers, etc	20,000.00	.....	20,000.00	19,794.32	205.68
Gaging streams	100,000.00	$31,261.00	131,261.00	130,806.94	454.06
Paleontologic researches	10,000.00	.....	10,000.00	9,989.75	10.25
Chemical and physical researches	20,000.00	.....	20,000.00	19,497.93	502.07
Preparation of illustrations	18,280.00	.....	18,280.00	18,066.75	213.25
Mineral resources of the United States	75,000.00	26.56	75,026.56	74,533.83	492.73
Books for library	2,000.00	.35	2,000.35	1,397.19	603.16
Replacing articles destroyed by fire	15,810.00	.....	15,810.00	14,309.22	1,500.78
Improving and safeguarding electric wiring system	2,000.00	.....	2,000.00	1,999.53	.47
Topographic surveys	300,000.00	39,991.25	339,991.25	336,329.56	3,661.69
Geologic surveys	200,000.00	34,178.07	234,178.07	233,518.65	659.42
Mineral resources of Alaska	80,000.00	.45	80,000.45	79,419.32	581.13
Geologic maps of United States	100,000.00	67,076.37	167,076.37	154,265.20	12,811.17
Surveying forest reserves	75,000.00	111.28	75,111.28	74,629.16	482.12
Testing fuel	250,000.00	827.46	250,827.46	247,742.33	3,085.13
Testing structural materials	100,000.00	5,023.46	105,023.46	83,279.25	21,744.21
Inspecting mines in Territories	7,350.00	.....	7,350.00	3,185.98	4,164.02
Investigating mine accidents	150,000.00	2,707.50	152,707.50	150,934.40	1,773.10
	1,590,680.00	181,203.75	1,771,883.75	1,718,204.93	53,678.82

LIBRARY.

The library received during the year 11,761 book publications and 512 maps. This includes all purchases made with the appropriation of $2,000 and all material received by exchange and gift. The publications of scientific societies and of state and national surveys are procured by exchange whenever possible, the library funds being reserved to purchase the necessary scientific periodicals, reference books, monographs published independently, and out-of-print publications, particularly paleontologic works, which are needed to complete the Survey sets. A number of valuable works have been presented by their authors. About 2,000 pamphlets were received from Prof. Charles Schuchert, of Yale University. The library now contains 64,084 numbered volumes exclusive of the unbound periodicals received during the year. All new material is placed on the exhibition shelves for one week, thus enabling those who so desire to keep posted on the new literature.

The persons consulting books and maps in the library during the year numbered 8,717. Besides this, 9,460 books and 528 maps were loaned for use outside of the library.

The cataloguing of current accessions has been kept up to date and the publications of the geological surveys of Great Britain and of the Australian States (about 1,500 items), of which the library has nearly full sets, have been completely catalogued. These catalogue entries have been sent to the Library of Congress, where they are printed on cards which are placed on sale. As in previous years, the Survey library has continued to furnish to the Library of Congress catalogue entries of geologic books. Librarians and others interested in making geologic collections are by the use of these cards relieved of the labor of cataloguing. Sets of these titles, which may be had from the Library of Congress, form the only complete, up-to-date list in existence of the publications of national and state surveys.

The alphabetical subject catalogue now includes about 8,500 cards and is progressing at the same rate as the author catalogue.

The exchange list, which is supervised in the library, includes the names of 835 libraries, of which 260 are in the United States and 575 in foreign countries. These libraries receive all book publications of the Survey as issued. They are chiefly those maintained by scientific societies and institutions, by universities, and by government bureaus devoted to mining and geologic research. Persons are not included in this exchange list and no list is maintained of persons to whom all the Survey publications are regularly forwarded. Individuals receive only such publications as they request. During the year 37 bulletins, 10 water-supply papers, 7 professional papers, the Twenty-ninth Annual Report, Monograph XLIX, and Mineral Resources for 1907, in all 58 volumes, were issued to regular exchanges, making an exchange distribution of nearly 48,500 volumes.

The bibliography of North American geology for 1906 and 1907, consisting of 2,672 titles and a comprehensive index, was compiled during the year and published as Bulletin 372. The bibliography for 1908 (Bulletin 409) is well advanced.

The correspondence, which refers largely to the exchange and the purchase of books, consisted of 3,300 letters received and 3,835 letters sent. Ninety-four letters and other papers were translated by members of the library force for other branches of the Survey.

REPORT OF THE GOVERNMENT HOSPITAL FOR THE INSANE.

OFFICERS OF THE HOSPITAL.

BOARD OF VISITORS.

F. M. Gunnell, M. D., U. S. N., *President of the Board.*
Hon. William A. Maury.
G. Lloyd Magruder, M. D.
Mrs. G. Gardiner Hubbard.
Mrs. Henry G. Sharpe.
Walter Wyman, M. D., *Surgeon-General, P. H. and M. H. S.*
Mr. Scott C. Bone.
Brig. Gen. George M. Sternberg, U. S. A.
Rev. John M. Schick, D. D.

Executive Committee of the Board.

Messrs. Gunnell, Maury, and Sternberg.

Chaplains.

Rev. C. H. Butler.
Rev. W. G. Davenport.
Rev. C. M. Bart.
Rev. Hugh T. Stevenson.
Rev. John Chester, D. D.

MEDICAL STAFF.

Superintendent.

William A. White, M. D.

First Assistant Physician.

M. J. Stack, M. D.

Clinical Director.

Henry W. Miller, M. D.

Assistant Physicians.

B. R. Logie, M. D.
Mary O'Malley, M. D.
Harry R. Hummer, M. D.
George H. Schwinn, M. D.
Alfred Glascock, M. D.

Junior Assistant Physicians.

Wm. L. Sheep, M. D.
Wm. H. Hough, M. D.
A. C. Fitch, M. D.
M. Edith Conser, M. D.

Medical Internes.

C. R. Bell, M. D.
Geo. M. Gehringer, M. D.
Harry Sicherman, M. D.
Eva C. Reid, M. D.

Pathologist.

I. W. Blackburn, M. D.

Histopathologist.

Nicolas Achúcarro.

Psychologist.

S. I. Franz, A. B., Ph. D.

Visiting Dentist.

A. D. Weakley, D. D. S.

Dental Interne.

Erwin E. Downing, D. D. S.

Visiting Ophthalmologist.

Arthur H. Kimball.

Veterinarian.

John P. Turner, V. D. M.

Steward.

Monie Sanger.

Purchasing Agent.

A. E. Offutt.

Matron.

H. O'Brien.

Chief of Training School.

Vacancy.

CONSULTING STAFF.

Internal medicine.

Dr. S. S. Adams.
Dr. G. W. Cook.
Dr. Sterling Ruffin.
Dr. James D. Morgan.

General surgery.

Dr. J. Ford Thompson.
Lieut. Col. Wm. H. Arthur, U. S. A.
Dr. G. T. Vaughn.
Dr. W. P. Carr.

Gynæcology.

Dr. Joseph Taber Johnson.
Dr. H. L. E. Johnson.
Dr. J. W. Boveé.
Dr. I. S. Stone.

Ophthalmologist.

Dr. D. K. Shute.
Dr. W. K. Butler.

Laryngology.

Dr. C. W. Richardson.
Dr. J. J. Richardson.
Dr. W. A. Wells.
Dr. F. T. Chamberlin.

Genito-urinary diseases.

Dr. E. F. King.
Dr. Wallace Neff.

Medical zoology.

Dr. C. W. Stiles.
Dr. Thomas A. Claytor.

Bacteriology.

Dr. W. B. French.
Dr. H. D. Giddings.

REPORT OF THE GOVERNMENT HOSPITAL FOR THE INSANE

WASHINGTON, D. C, *July 1, 1909.*

SIR: The Board of Visitors of the Government Hospital for the Insane has the honor to submit the fifty-fourth annual report of the hospital, consisting of the report of the superintendent for the fiscal year ended June 30, 1909, and his recommendations.

Respectfully,

F. M. GUNNELL, M. D.,
President of the Board of Visitors.
WM. A. WHITE, M. D.,
Superintendent, Secretary of the Board ex officio.

The SECRETARY OF THE INTERIOR.

REPORT OF THE SUPERINTENDENT.

MOVEMENTS OF POPULATION.

There were remaining in the hospital on June 30, 1909, 2,852 patients, as against 2,733 patients remaining June 30, 1908, an increase of 119. During the year there were 691 admissions, an increase of 48 over the previous year. This number added to 2,733, number of patients remaining at the end of the last fiscal year, makes the total of 3,424 patients under treatment during the year. The number of discharges, including the deaths for the year, was 527. The daily average population for the past twelve months was 2,801.66, showing an increase over the preceding year of 136.96.

The following table shows the movements of population more comprehensively and has divided the male, female, the white, and the colored:

Movement of population, fiscal year ended June 30, 1909.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Remaining June 30, 1908	1,669	329	480	255	2,733
Admitted during year ended June 30, 1909	411	106	120	54	691
Total number under treatment	2,080	435	600	309	3,424
Discharged:					
Recovered	105	21	41	16	183
Improved	46	6	23	7	82
Unimproved	31	4	5	2	42
Not insane	6	1	3		10
Died	162	23	42	28	255
Total	350	55	114	53	572
Remaining June 30, 1909	1,730	380	486	256	2,852

BUILDINGS AND GROUNDS.

The fifty-five block roadway near the laundry, and the paving in the rear of R and P buildings, which was begun last year, has been completed, as has also the granite curb for which a contract was let last year. The surface grading and seeding necessary to complete the lawn near the laundry has been completed. Concrete walks have been laid in the rear of the Richardson group, along the subway and near the laundry, amounting in all to about 1,170 linear feet.

Some work has been done on the road to the cemetery, the grade being improved in places, the gutters cleaned, and the culverts repaired. The slopes of the cut through the subway have been sodded, and about 800 linear feet of concrete wall built along the foot of these slopes.

Barns, hennery, and brooder.—A new barn has been built at Godding Croft for the accommodation of calves. The past year we have added some blooded bulls to our herd, and are going to try to raise our own cows. We believe that would be much more profitable than buying them. This barn will accommodate 60 calves; we have at this time approximately 50. It is built along modern lines, plenty of light, is ventilated with cheese cloth, and has cement floor, so that it is sanitary in every way. A new hennery has also been built at Godding Croft which will accommodate all of the hens. The hens will presently be moved from the old henneries down there, and the old henneries torn down. In connection with the hennery a brooder house has also been constructed, so that the entire work of raising and caring for the hens will hereafter be done at Godding Croft.

Plumbing.—The plumbing in the Home and Relief buildings, for which a contract was let last June, has been completed. It consisted chiefly in substituting shower baths for tubs, and modern sanitary closets for the old iron straight hoppers, and the installation of slop sinks.

Remodeling of Oaks A.—This building has been remodeled so that the tubercular ward has been made materially less, as it is only needed for about a half dozen beds, and the rest of the second floor thrown open to white female patients, with physicians' quarters in the front. It has increased the capacity of the building already approximately 15 beds. The partition has been completed separating the two sides of this floor, and additional closets placed for the new wards thus created.

Consolidation of power plant.—Work has been begun on the construction of a new boiler house on the other side of the stack from the present boiler house. The excavation has had to extend to a considerable depth so that the concrete retaining wall could be placed at the base of the hill and thereby make the construction safe. This new boiler house will contain four 300-horsepower boilers, and, with the new boiler house with which it will be coupled up, will supply all of the power and heat for the entire plant. New coal pockets will also be built in connection with it.

Wards.—Dawes 2 was occupied by colored patients on November 19, 1908. White Ash was occupied November 19, 1908, by white patients transferred from Howard Hall. These are patients who were not under sentence and those whose sentences had expired.

This change was made in order to get another ward for the use of colored patients in Howard Hall, wards 3 and 4 being overcrowded. Howard Hall 2 was occupied by colored patients November 19, 1908, to relieve excesses on wards 3 and 4. The dormitory on the third floor, known as "Howard Hall 9," was occupied November 9, 1908, by white prisoners in order to relieve excesses on wards. Cedar ward was occupied as an open ward by convalescents on August 11, 1908. Chestnut ward was occupied November 20, 1909, also as an open ward for convalescents. This practically completes all of the available space in the institution for patients. All of the wards are now occupied, and as the population of the hospital is rapidly increasing the time is not far distant when they will be crowded.

Male nurses' home.—This building, which was being remodeled last year, was occupied September 22, 1908. It accommodates 46 nurses. It is serving its purpose very well, and the men seem to be very much pleased with their new home.

Operating room.—The sterilizers have been removed from the operating room and placed in an adjoining room and the operating room painted.

Amusement hall.—The amusement hall has been practically finished. The contractor's work is almost done, and the contracts have been let for furnishing it. It will be fully completed and furnished some time during the middle or the latter part of August. The building is a very satisfactory one indeed. It is well constructed, and in every way will serve the purpose for which it was intended. It will seat approximately 1,200 people—a little over 800 downstairs and over 300 upstairs.

ADMINISTRATIVE DEPARTMENT.

OFFICE OF THE STEWARD.

The steward makes the following report: "Attention is again called to the rapid growth of the institution and the necessity of providing ways and means to enlarge the capacity in the shape of beds in order to keep up with the new patients being received. All available space for beds, with the exception of the room off Spruce ward and the porches and dormitory in Oaks A, is now utilized, and further additions will necessarily have to be new buildings. New buildings will decrease available farm land now entirely too small in acreage for the number of people in this institution. The patients and employees together now number more than 3,600 people. It is desirable that a certain class of supplies, such as milk and fresh vegetables, should be raised on the home farm. You will see the absolute necessity for additional land for this purpose. Above everything else, we should have more land for garden truck and farming purposes adjacent to the institution. This is probably one of the greatest needs of the institution. At the present rate of increase we will soon be compelled to provide additional quarters for female patients. There is practically no available space on which to erect additional buildings for female patients; therefore, there should be additional land for the buildings just south of the present reservation. The Oaks building, which has been renovated and spoken of before as having additional room for patients, is now occupied by

two of the female physicians. The third floor of this building is available for employees.

"New boilers have been purchased for the stable, and the complaints of the past regarding the proper heating of this building should be eliminated.

"To keep the stock up to standard, 8 additional horses and 24 cows have been purchased, and the old horses have been disposed of. The calf barns at Godding Croft are completed and are ready to be put into use during the winter months when it is necessary to house these animals. The poultry house and brooder at the same place have been completed and the poultry will be moved during the present week. The old buildings across Nichols avenue are at once to be razed, thus improving the appearance of this land.

"Meters have been ordered for wells, kitchens, pumping station, and power house, and in this way we soon expect to be able to keep in a more systematic manner the cost and use of the hot and cold water. We will also be enabled to ascertain in case of a drouth or shortage of water the best place to curtail the supply. In this connection we must again call attention to the necessity of building at some future time a large reservoir and filtration plant. The water in use at present contains so much mineral and metal that it has a tendency at times to stain the clothes passing through the laundry; also increasing the quantity of soap needed to soften the water to get the proper results. Then, too, with a large reservoir, we might be able to utilize all the water we could use properly for condensing purposes, passing it through a filter and reusing it in the laundry, in this way decreasing the amount of water drained for this purpose from our wells—180,000 gallons a day. If this change was made we would, with a little care, have an ample water supply for other purposes without additional wells for many years to come.

"An entire new set of tin cans have been ordered for cold storage in which to manufacture ice, and the cork coverings leading to the cold-storage rooms and in the ice plant have been entirely re-covered.

"Two thousand new ties and five sets of ties for railroad switches have been purchased, and the workmen are at present replacing and repairing the entire length of the track and the switches adjacent thereto.

"Two sanitary carts have been ordered for the collection of garbage. These carts are more modern than the ones in present use and should give better satisfaction.

"The entrance to the Old Center building, which has long been in a dilapidated condition, has been torn down and restored as far as possible to its original appearance.

"The windows in A building, which were held by the Loxit balance, have been changed to the usual weight balance, making them much easier to handle and a great deal cheaper to keep in repair.

"The subway connecting the east and west sides has been entirely resodded, reaching down to the cement wall completed during the past year, and presents a much better appearance.

"The matron has furnished this office monthly a report of the sewing and mending rooms. The condemning room in the basement of the Old Center building, which has been used for some time past, has been of great assistance to the matron, and the

means of a great saving to the institution. The old condemned material is now brought to this central place, thus preventing these articles being used over again, for exchange, or through carelessness or misappropriation, extra articles being secured. The matron continues her practice of making regular visits to the wards, and the work under her supervision in the sewing room, repair shops, and all parts of this institution continues up to its usual excellent standard. We append list of articles made in the sewing room, home-grown farm and garden products, etc.

"The work in the laundry has increased materially during the past year. A change was made in this department in the past year, a female assistant to the foreman having been appointed who will have direct charge of the woman help, and act as housekeeper to this class of employees that live on the premises. This can not but improve the tone and raise the standard of the immediate surroundings of these employees.

"During the past year there has been a change in the culinary department, a new chef, male, succeeding the former female, who was made assistant chef. The assistant chef was put in immediate charge of all the employees' dining rooms.

"During the past year for the first time the general supply committee of the United States Government began its work, but it is too early to say what benefits or otherwise will accrue to this institution. There are many items on their list which appear a great deal higher than similar articles cost the institution in former years, while others are cheaper. We are not prepared to say to what extent either of these is due to the purchasing agency. The general tendency of increased prices on various articles control many of these prices. Nevertheless, it seems to us that some of this increase is due to being grouped with small purchasing bureaus where these supplies are bought in less quantity."

Work of sewing and mending rooms.

ARTICLES MANUFACTURED.	
Aprons:	
Barbers'	1
Denim	4
Dining room	72
Gingham	89
Operating	12
White	528
Bags:	
Clothes	3
Jelly	6
Bars, mosquito	18
Bases, ball	3
Bath tub, canvas	1
Bibs	24
Blouses	825
Caps:	
Rubber	30
Surgeons'	4
Cases:	
Bolster	1
Pillow	3,831
Pillow, rubber	7
Chemise	827

ARTICLES MANUFACTURED—continued.	
Cloths:	
Filter	6
Table, long	153
Table, short	227
Coats:	
Brown linen	1
Cashmere	2
Drilling	24
Jean	995
Overalls	316
Surgeons'	2
Cords and tassels	14
Covers:	
Book	2
Bureau	113
Car	24
Chair	4
Corset	3
Couch	9
Cushion	4
Screen	84
Stand	333
Table	6

Work of sewing and mending rooms—Continued.

ARTICLES MANUFACTURED—continued.	
Curtains:	
Holland	655
Rubber	1
Sash	28
Swiss	50
Transom	100
Cushions, sofa	4
Drawers:	
Boys', Canton flannel	6
Men's, Canton flannel	2,088
Men's, cotton	6
Women's, cotton	468
Dresses:	
Denim	96
Gingham	572
Night, long	170
Night, short	547
Percale	81
Gowns, operating	12
Leggings	3
Pants:	
Boys'	7
Dairy	24
Jean	1,190
Overall	851
Outing	4
Soldiers'	868
Petticoats:	
Cotton	862
Red flannel	1
Sheets:	
Double	51
Single	4,962

ARTICLES MANUFACTURED—continued.	
Shirts:	
Blue flannel	3
Boy's, Canton flannel	6
Men's, Canton flannel	1,657
Check	2,821
Night	942
Outing	4
Shirt waists	22
Skirts:	
Cashmere	3
Denim	74
Gingham	51
Percale	1
Strops, razor	7
Suits, canvas	3
Ticks:	
Mattress, double	9
Pillow	42
Mattress, single	386
Towels:	
Bath	2,865
Roller	2,753
Tea	2,169
Underhandkerchiefs	174
Vests	245
REPAIRS AND MISCELLANEOUS WORK.	
Blankets, hemmed	2,051
Napkins, hemmed	676
Names sewed on	10,290
Rugs bound	89
Suits cleaned and pressed	42
Miscellaneous repairs....pieces	39,651

Work done in mattress shop.

Mattresses made and made over	1,016	Pillows made and made over	948
Mats made:		Tick, bolster, made	1
Braided	203	Hair renovated....pounds	22,125
Drawn	55	Clothing repaired....pieces	949
Husk	55	Hose repaired....pairs	1,263

Work done in Howard Hall workroom.

Clothes repaired....pieces	4,407	Cloth mats made	42
Hose repaired....pairs	150	Mittens and gloves made..pairs	341
Suits cleaned and pressed	8	Knee pads made	14
Shoes repaired....pairs	182	Condemning bag made	1
Chairs caned	84		

Farm and garden products.

Apples, crab....bushels	40	Cherries....quarts	1,158
Apples, green....barrels	281	Chicken....pounds	1,816
Beans:		Corn:	
Lima....bushels	242	Green....ears	26,560
String....barrels	300	Shelled....bushels	28
Beets....bunches	24,013	Ear....barrels	61
Cabbage....heads	24,639	Cucumbers	4,920
Cantaloupes	8,161	Currants....quarts	200
Carrots....bunches	4,250	Ducks....pounds	254
Celery....do	9,426	Eggs....dozen	5,741

Farm and garden products—Continued.

Eggplant		3,252
Figs	bushels	14
Grapes	pounds	3,946
Honey	do	920
Kale	barrels	541
Lettuce	heads	14,215
Milk	gallons	95,086
Onions:		
Dried	barrels	7
Green	bunches	39,470
Oyster plant		2,755
Parsley	bunches	17,254
Parsnips	barrels	186
Peaches	bushels	12
Pears	do	273
Peas	do	142
Peppers, green	do	119
Plums	do	7
Pork	pounds	16,907
Potatoes:		
Irish	bushels	843
Sweet	do	1,212
Pumpkins		2,620
Radishes	bunches	25,391
Rhubarb	do	377
Spinach	barrels	185
Squash, summer		25,571
Tomatoes	bushels	1,493
Turnips	do	1,582
Watermelons		2,603
Timothy and clover, green	tons	27
Corn, green	do	517
Cowpeas, green	do	67
Cowpeas, hay	do	35
Wheat and clover, green	do	107
Grass	do	27
Sweet potato roots	bushels	206

ENGINEERING DEPARTMENT.

During the past year there has been a great deal of activity in this department, and aside from the ordinary repairs, which have been many, a considerable amount of new work has been done. Some of the most important of this work is the overhauling of the steam lines in the new tunnel, changing the traps on the heating system in the new buildings, the placing of steam tables in the dining rooms in the new buildings, and the cleaning out and rebuilding of the flume across the flats to the river channel, through which river water is pumped. At present the department is engaged in working on the wells with a view to increasing their yield of water. The work, however, has not progressed sufficiently to be able to determine what the results are going to be.

In the electrical division the work has largely been taken up with repairs and readjustments to new construction. The great work which will soon be under way will be the rewiring of the old building and the laying of conduits throughout the grounds for the proposed change in the electrical plant of the institution from a direct to an alternating current.

MEDICAL AND SCIENTIFIC DEPARTMENTS.

CLINICAL DIRECTOR'S REPORT.

The clinical director reports as follows: "I have visited the various medical services of the hospital at least once a month with the senior physician in charge. The receiving services I have visited at least twice weekly. I have endeavored upon these visits to see every patient, to consult with the physician upon acute illnesses, unusual mental conditions, and other medical questions. I have investigated every case of restraint or seclusion, have observed the detailed treatment and care of the patients, offering suggestions where I deemed such necessary. In this way I have kept in close touch with the medical administration throughout the hospital, and have kept myself especially well informed

as to the mental and physical condition and also the treatment of the new cases.

"I have been called frequently, aside from my regular visits, in consultation in special cases of physical and psychical disturbances and I have encouraged the physicians to call upon me whenever any medical assistance or advice is required.

"All transfers from one service to another have been made, as you have requested, through my office. An attempt has been made, when transferring from the receiving department, to place in the other services certain acute patients, thus giving the physicians of the other departments an opportunity to treat, observe, and analyze early mental symptoms.

"I feel certain patients are now only restrained or secluded for good and sufficient reasons, and that serious consideration is given before such treatment is instituted, though I am careful to investigate each case and monthly request a detailed statement of the cause, duration, and nature of the restraint employed. There has been a material reduction in the amount of restraint and seclusion, and while numerically the records may appear high, attention should be drawn to the fact that the majority were so treated only for a very short space of time.

"*Clinical records.*—The condition of the clinical records in the various services is reported in detail by the senior physicians. I have endeavored, by suggestion and demonstration, to secure accurate, exhaustive, and scientific records.

"I have given much time to clinical examinations in the male receiving department where the number of admissions is the greatest, and where, owing to the small medical force, assistance was urgently required. In that service it has been my procedure to have the examinations recorded by one of the junior officers on the general plan as outlined in your instructions for the examination of patients. Before the records are presented for consideration at the staff meeting I personally examine the records, make alterations and elaborations when necessary, and prepare the summary.

"I regret that with the reduced medical staff it has been impossible to make detailed analyses of all the male patients admitted during the year and to continue the system of current monthly notes on the more chronic cases. I think such a procedure might be possible had we our full allotment of junior physicians and internes. However, I feel that throughout the hospital there has been a serious and constant endeavor on the part of the physicians to make valuable records in so far as they have been able to do so.

"During the year 547 case records have been presented and considered in the staff conference; 45 of this number were presented for diagnosis as recent admissions or for special report, 50 were presented for trial visit, 285 for discharge, and 167 for final diagnosis (cause of death).

"*Training school for nurses.*—Twelve nurses, 10 women and 2 men, were graduated from the training school. Seventeen nurses successfully passed the examination of the junior year and are eligible for membership in the senior class. With the appointment of a superintendent of nurses I propose to outline a course with fewer didactic lectures and more practical instruction, which unfortunately has been somewhat lacking during the past year. It is my

intention to make a thorough canvass with the object of inducing as many attendants as possible to enter the incoming junior class.

"*Infectious diseases.*—During the winter months 9 cases of diphtheria—2 women patients and 7 women employees—were treated in quarantine. The source of infection was undoubtedly a domestic who was exposed to contagion outside of the hospital and to whom could be traced practically every case which developed. This individual, while not suffering from the disease, was found, upon bacteriological examination of her throat, to harbor Klebs-Loeffler bacillus, and there seems little doubt but that she was the active causative agent of the outbreak. All patients made a good recovery without serious sequelæ.

"Thirteen cases of measles, 12 employees and 1 patient, developed during the prevalence of the epidemic in the District. The stringency of our quarantine regulations unquestionably checked the spread of this disease upon the reservation.

"There was an isolated case of typhoid fever which made its appearance in July, 1908, the first instance of this disease occurring among the patients of the hospital since 1903. While the source of contamination was not proven, it is presumed that the patient, who ate any object that attracted his attention, became infected by eating remnants of fruit or other edibles which had been left about the grounds by visitors. To ascertain whether a bacillus carrier was responsible, a bacterial examination of the fecal discharges of all the patients in the same ward with the patient was made at the hygienic laboratory, but no typhoid bacilli was found.

"*Accidents.*—During the year there have been 2 deaths by homicide, 1 of suicide, and 2 accidental deaths.

"On the 22d of September, 1908, a colored patient working with the road gang, without provocation, attacked the foreman of the gang with a crowbar and killed him instantly; also, while running away, killed a female paroled patient and struck another female, causing a fracture of both bones of the right forearm and some facial contusions. It was made the subject of inquiry by the coroner, who held that no blame should be attached to the hospital.

"A white male patient committed suicide by hanging himself to a settee on the morning of January 16, 1909. At 10 o'clock he was seen on the ward gazing out of the window in one of his characteristic attitudes. Fifteen minutes past 10, one of the attendants walked out on the porch and found the patient suspended from one of the heavy wooden benches. He had tied one coat sleeve around his neck, and the other to the arm of the bench and was hanging face downward, the weight of the whole body being suspended on the front of the neck. He was immediately taken into the ward and artificial respiration and stimuli hypodermically resorted to. At the end of a half hour treatment was discontinued, as the patient failed to respond in any way.

"The patient was committed in 1900, for several years was on parole, and never at any time had he shown the least suicidal intent. The sister of the patient, who visited him weekly, has since written in the highest terms of the care and attention given to her brother.

"Our last previous suicide occurred on August 5, 1905."

Physical diseases treated during the fiscal year ended June 30, 1909.

Disease.	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Patient.	Employee.	Patient.	Employee.	Patient.	Employee.	Patient.	Employee.	
General diseases.									
Infectious diseases:									
Diphtheria					2	7			9
Erysipelas	11								11
Gonorrhœa	8								8
Influenza	42	10		1					53
Malaria	28	1			3	2			34
Measles		2	1			10			13
Parotiditis	1								1
Syphilis—									
Secondary	7					1			8
Tertiary	1								1
Tonsillitis	30	16	20		4	11	1		82
Tuberculosis—									
Joint			1						1
Lymphatic gland	2		2						4
Miliary			2						2
Pulmonary	16		6		4		9		35
Typhoid fever	1								1
Other general diseases:									
Carcinoma of jaw	2								2
Carcinoma of œsophagus	1								1
Carcinoma of stomach	2								2
Rheumatism—									
Acute articular	5		2			1			8
Chronic	10								10
Diseases of the nervous system and organs of special sense.									
Angio-neurotic œdema	1								1
Cerebral embolism							1		1
Cerebral hemorrhage	5				1	1	2		9
Cerebral œdema	3								3
Conjunctivitis	26								26
Mastoiditis	1								1
Neuralgia	23	2							25
Neuropathic decubitus	4				2				6
Otitis media, acute	6	2	5						13
Polyneuritis	2				2				4
Sciatica	2								2
Status epilepticus	5								5
Diseases of the circulatory system.									
Anasarca, cardiac	2								2
Angina pectoris	2								2
Asthma, cardiac	1								1
Cardiac valvular disease	19				21		6		46
Endocarditis:									
Acute	3								3
Chronic	6								6
Gangrene of foot	4								4
Hemorrhoids	27		3						30
Pericarditis	1								1
Tachycardia, paroxysmal			1						1
Varicocele	3								3
Diseases of the respiratory system.									
Asthma	5								5
Bronchitis	83	32	38		8	5	1		167
Broncho-pneumonia	12		1		2				15
Coryza	16	21	25						62
Hypostatic pneumonia	2				1				3
Lobar pneumonia	6								6
Pleurisy, acute	9		1			1			11
Pleurodynia	1								1
Pulmonary gangrene	1								1
Pulmonary hemorrhage			2				1		3

Physical diseases treated during the fiscal year ended June 30, 1909—Continued.

Disease.	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Patient.	Employee.	Patient.	Employee.	Patient.	Employee.	Patient.	Employee.	
Diseases of the digestive system.									
Angiocholitis	1								1
Appendicitis, acute	3	2			1				6
Colitis, acute	5								5
Cholecystitis	3								3
Enteritis	19	6	10		2		3		40
Entero-colitis	5								5
Fistula in ano	2		1						3
Foreign body in stomach	1								1
Gangrene of bowel	2								2
Gastralgia	1								1
Gastritis, acute	14								14
Gastro-enteritis	2								2
Hematemesis	3								3
Indigestion, acute	1				1	1			3
Inguinal hernia	4								4
Hyperchlorhydria	2								2
Peritonitis	2		1						3
Ptomaine poisoning	100	10		1		2		1	114
Ranula	2								2
Uncinariasis	1								1
Undiagnosticated gastric disturbances	2								2
Diseases of the genito-urinary system.									
Balanitis	1								1
Chancre	1								1
Cystitis:									
Acute	10		2						12
Chronic	15								15
Epididymitis			1						1
Hydrocele	1								1
Hypernephroma	2								2
Nephritis:									
Acute	1				1				2
Chronic	8	1			2		3		14
Orchitis	1		1						2
Pyelonephritis	3								3
Urethral fistula	2								2
Urethral stricture	2			1					3
Diseases of the skin and cellular tissue.									
Abscesses:									
Alveolar	2								2
Ischio-rectal	1		1						2
Minor	52	1	5		12	1	1		72
Carbunculosis	7								7
Cellulitis	1		2						3
Cysts, sebaceous	2	2							4
Dermatitis:									
Simplex	2				1				3
Venenata	3		1		1				5
Eczema	9	2	7						18
Epithelioma of hand	1								1
Epithelioma of face	1								1
Furunculosis	37								37
Herpes zoster	6		1						7
Impetigo contagiosa	1								1
Ingrowing nails	5		1		2	1			9
Onychia	2								2
Pediculosis	2								2
Pemphigus		1							1
Psoriasis	4				1				5
Purpura hemorrhagica	1								1
Scabies	8				3				11
Tinea:									
Circinati	20				1				21
Saginati	1				1				2
Ulcers:									
Simple	1	1	4						6
Syphilitic	2		1						3
Varicose	15		2						17

Physical diseases treated during the fiscal year ended June 30, 1909—Continued.

Disease.	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Patient.	Employee.	Patient.	Employee.	Patient.	Employee.	Patient.	Employee.	
Diseases of the organs of locomotion.									
Arthritis, acute	5								5
Lumbago	1								1
Periostitis of tibia	1								1
Rheumatism, muscular	7	1							8
Accidental traumatisms.									
Burns:									
First degree	6	1			1		1		9
Second degree							1		1
Dislocation of clavicle							1		1
Dislocation of jaw	1								1
Dislocation of shoulder	2						1		3
Dislocation of wrist		1							1
Fracture of astragalus	1								1
Fracture of clavicle	2								2
Fracture of femur	4		1		4				9
Fracture of frontal bone	1								1
Fracture of metacarpals	5				1				6
Fracture of nasal bones	1								1
Fracture of radius	1					1			2
Fracture of radius and ulna					1	1			2
Fracture of rib	4	1	1		1				7
Fracture of skull	1				1				2
Fracture of tibia			1						1
Haematoma auris	3		1						4
Haematoma cruris	1		1						2
Heat exhaustion	2								2
Sprains	14	2	2		3				21
Wounds:									
Contused	46	2	3						51
Gunshot			1						1
Incised	50	1	4				3		58
Infected	28		1	1	1		1		32
Lacerated	75	6	42		2	1		2	128
Punctured	3	1	2						6
Miscellaneous.									
Paracentesis, abdominal	3								3
Post-operative infection					1				1
Undetermined fever	2	2							4
Total	1,126	130	211	4	95	47	36	3	1,652

Causes of death during the year ended June 30, 1909.

Disease.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
General and infectious diseases.					
Addison's disease	1				1
Carcinoma of liver	1				1
Carcinoma of œsophagus	1				1
Carcinoma of throat	1				1
Carcinoma of stomach	1				1
Diabetes mellitus	1				1
Hypernephroma, malignant and cardiac	1				1
Hypernephroma paralysis	1				1
Inanition and exhaustion	1				1
Infection, post-operative			1		1
Pernicious anæmia	1				1
Pyæmia	1				1
Septicæmia	1		1		2

Causes of death during the year ended June 30, 1909—Continued.

Disease.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Tuberculosis:					
General miliary				1	1
Intestinal	1				1
Pulmonary	17	2	5	11	35
Diseases of the nervous system.					
Bulbar paralysis	1				1
Cerebral gumma	1				1
Cerebral hemorrhage	8	1	1	3	13
Cerebral œdema	1	1	1		3
Cerebral softening and exhaustion	1	3		1	5
Cerebral syphilis			1		1
Cerebral tumor		1			1
Manic-depressive insanity and exhaustion				1	1
Meningitis, acute			1		1
Organic brain disease and exhaustion	1		2		3
Organic brain disease and convulsions			1		1
Organic brain disease and cerebral œdema	1				1
Pachymeningitis, hemorrhagic	1				1
Paresis and convulsions	1				1
Paresis and exhaustion	14	2	3	3	22
Paresis and bulbar paralysis	1				1
Senile dementia and exhaustion	5		4		9
Senile dementia and cerebral œdema	1				1
Status epilepticus	5	1		1	7
Diseases of the circulatory system.					
Aneurism of aorta	1	1			2
Arteriosclerosis and exhaustion	1			1	2
Arteriosclerosis and chronic nephritis	1				1
Arteriosclerosis and gangrene	1				1
Arteriosclerosis and rupture of aorta	1				1
Cardiac valvular disease	24	3	9	4	40
Endocarditis, chronic	2		2		4
Myocarditis	4		1		5
Pericarditis, acute	1		1		2
Diseases of the respiratory system.					
Broncho-pneumonia	12	2	1		15
Hypostatic pneumonia	9	1			10
Lobar pneumonia	7				7
Pulmonary gangrene	2				2
Pulmonary œdema	2	1			3
Pulmonary thrombosis	1				1
Diseases of the digestive system.					
Cholangitis, suppurative	1				1
Cholecystitis, chronic suppurative	1				1
Enterocolitis	3		2		5
Gangrene of bowel	2				2
Intestinal paralysis and hemorrhage	1				1
Pancreatic abscess and peritonitis		1			1
Peritonitis	3				3
Volvulus of colon	1				1
Diseases of the genito-urinary system.					
Abscess of kidney			1		1
Cystitis:					
Chronic	1				1
Hemorrhagic		1			1
Cystitis and pyelonephritis	2				2
Nephritis:					
Chronic interstitial	2		1		3
Chronic parenchymatous			1	1	2
Acute parenchymatous				1	1
Pyelonephritis	2	1			3
Uræmia	1				1
External causes.					
Asphyxiation	1				1
Cerebral concussion			1		1
Drowning (accidental)		1			1
Surgical shock			1		1
Total	162	23	42	28	255

SURGERY.

The following operations were performed during the year. Minor operations to the number of 633 were performed by members of the medical staff. The number of lumbar punctures performed for diagnostic purposes is listed in the report of the pathological laboratory.

Surgical operations performed during the year.

Operation.	Male.	Female.	Total.	Result.		
				Recovered.	Improved.	Died.
Adenoidectomy		1	1	1		
Amputation of leg	1		1	1		
Amputation of toe	1		1		1	
Appendectomy	2		2	2		
Cervical adenectomy	3		3	3		
Colle's fracture, reduced	1	1	2	2		
Colopexy	1		1	1		
Compound comminuted fracture of ankle, repair of	1		1		1	
Cystotomy:						
Perineal	1		1		1	
Suprapubic	2		2	1	1	
Epithelioma of face, excision of	1		1	1		
Epithelioma of hand, excision of	1		1	1		
Excision of varicocele	1		1	1		
Fracture of femur, reducing	4	1	5	5		
Fracture of clavicle, reducing	2	1	3	3		
Fracture of humerus	1		1	1		
Fracture of metacarpal bones, reducing	2	1	3	3		
Fracture of ribs, reducing	3	1	4	4		
Fracture of radius and ulna, reducing		1	1	1		
Gastrotomy, for removal of foreign body	1		1	1		
Hemorrhoidectomy	2		2	1	1	
Herniotomy, inguinal	2		2	2		
Hydrocele, radical cure for	1		1	1		
Hysterectomy		2	2	1		1
Incision of alveolar abscess	1		1	1		
Incision of ischio-rectal abscess	1		1	1		
Incision of sacral abscess		1	1		1	
Laparotomy, for peritonitis	2		2		1	1
Lipoma, removal of	1		1	1		
Perineorrhapy		1	1	1		
Potts' fracture, reducing	1		1	1		
Reuniting severed tendons and nerves of arm	1		1	1		
Scraping tubercular elbow	1		1		1	
Suturing incised larynx	1		1	1		
Tonsillectomy		1	1	1		
Trachelorrhaphy		1	1	1		
Urethrotomy:						
Internal	1		1	1		
Perineal	1		1	1		
Uterine fibroid, removal of		1	1	1		
Total	45	14	59	49	8	2

Hydrotherapeutic department.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Number of patients	527		559	176	1,262
Number of treatments	9,143		10,226	3,639	23,008

Dr. Arthur H. Kimball, in charge of the eye, ear, nose, and throat department, submits the following report of work done in his department during the year ending June 30, 1909:

Number of visits		55
Examinations and treatments:		
Refractions	237	
Diseases of eye	147	
Diseases of ear	105	
Diseases of nose and throat	147	
Operations	3	
Number of patients		639

Dr. A. D. Weakley, in charge of the dental department, submits the following report of work done in his department during the year ending June 30, 1909:

Teeth and roots extracted	1,471
Teeth treated	665
Mouths cleaned	139
Teeth filled with cement, gutta-percha, and silver	735
Teeth filled with gold	9
Artificial teeth repaired	33
Artificial teeth, new	21
Cases for local anæsthetic	33
Teeth containing diseased nerves, saved	63
Teeth crowned	2
Mouth washes prescribed	47
Total number of patients treated and examined	3,218

The above large increase in the services of this department were made possible by the appointment of a dental interne who was on duty from September 1, 1908, to June 23, 1909.

PSYCHOLOGICAL LABORATORY.

The psychologist reports as follows: "On the material side there have been no purchases of apparatus during the year. During this time there have been made many new pieces of a simple nature, such as a series of Von Frey hairs, for touch and pain sensation tests. A number of other small pieces have been made during the year for tests of other kinds of sensibility in connection with the investigations in these lines which have been in progress.

"About January 15, 1909, new radiators were installed, each with much greater heating surface than the old ones, and since that time no difficulty has been experienced with the amount of heat in the laboratory. This improvement has made the laboratory available for work at times when with the old heating apparatus it would have been impossible to experiment with patients.

"Since the advent of the clinical director, about October 1, 1908, I have been relieved of routine examinations of patients, for the purpose of diagnosis, and the additional time available from this has been utilized in investigation. At the same time attendance upon the daily staff meetings was discontinued, and this also left more time for strictly scientific work.

"During the year a number of problems have been worked over and some of the material collected has already been collated and articles

published or placed in the hands of editors for publication. A detailed account of the work of investigation and the publications from the laboratory follows.

"1. Experiments on the time and character of the knee jerks in paretic patients have been finished, and the work has already appeared in the January, 1909, number of the American Journal of Insanity. In this work the time of the knee jerks of eight patients, suffering from general paralysis of the insane, was investigated, and the surprising result of no distinct change in the time of the reflexes was obtained. The study showed clearly that these accurate experiments gave no warrant to the usual assumption that exaggerated knee jerks are quicker than normal, and that diminished knee jerks are slower than normal. In addition to the study of the time of the knee jerks in these patients a statistical study of the clinical reflex findings in all paretics that died during the previous ten years was made and the results from these patients were compared with somewhat similar results published by other investigators. The characters of the knee jerks were correlated with the characters of all other reflexes that were recorded and with the general clinical picture, and the results led to many interesting conclusions.

"2. The account of the case of Korsakow's psychosis, to which reference was made in the last report, was finished, and this work was published in the October number of the American Journal of Insanity. This work was published jointly with Dr. Mary O'Malley, woman physician. This case was quite unusual, in that none of the usual causes of polyneuritis could be detected, and the conclusion was made that it was one of the rare cases in which the cause of the nervous degeneration was within the body and of an autotoxic nature.

"3. The general account of the present status of psychiatry, prepared to be read at Toronto about eighteen months ago, appeared in the second volume of the Bulletin of the Ontario Hospitals for the Insane.

"4. During the whole year considerable time has been spent upon sensory examinations, both of normal and abnormal individuals. A number of observations which were made by me several years ago gave an indication for this work, in that it appeared probable that more of the mental disturbances than have been suspected are somehow or somewhat due to changes in the ability to appreciate stimuli from the external world. The preliminary observations were of such a character, however, that they gave no indications of what the sensory changes meant for the individual. It was therefore thought necessary to experiment with mentally normal individuals, both those who had known or knowable lesions of the nervous system, and perfectly normal individuals in whom experimental changes might be produced. Two cases of nerve division were examined during the year. The results from one of these were prepared as three articles, and these have appeared in the current volume of the Journal of Comparative Neurology and Psychology. The results of the examination of the other individual will appear in an article which is now in course of preparation. Two other individuals, without nerve lesions, have been experimented with after various anesthetic and analgesic agents have been applied to different parts of the body. The effects of ethyl chlorides and of some other cooling agents have already been worked over with most interesting results, and these results are now

being prepared for publication. In connection with these experiments I have had the opportunity to examine carefully a patient, of normal mind, in whom there is a lesion in the post-central convolutions, and the results in the examinations of this woman were strikingly indicative of some association between this cerebral area and the sensations of touch. All of this work at first appears far apart from problems of the insane, but in reality all has been necessary that finer methods and new facts may be used as comparison with results from the insane. In the experiments with individuals in whom nerves have been divided I discovered certain sensation changes that were not previously appreciated or known, especially important being the finding that in the hairs there were two kinds of sensation. In the experiments with the normal individuals upon whose skin anesthetic and analgesic agents were applied there was found a similar dissociation of the sensibility.

"In recent weeks the methods of these examinations have been employed with certain selected cases on the wards, and the number of patients in whom sensory disorders can be demonstrated has been striking. Already three cases have shown marked sensory changes previously unnoted and perhaps unsuspected. From the results of these examinations up to the present, it would appear that a very important new factor for the understanding of the mental content of the insane has been shown to exist, but before the facts can be correlated and understood many more individuals must be carefully examined.

"5. For the evening staff meetings three papers were prepared and read. One of these is a general paper, 'The functional view of the insanities.' A second paper, 'On the use of association tests for the determination of mental contents,' written in conjunction with Dr. William A. White, superintendent, brings out the importance and the precautions that need to be observed in the interpretation of the results of association tests when dealing with the abnormal classes. The experimental part of the work was done with ten normal persons, including nurses and members of the staff, and the results show clearly some of the errors into which other writers have fallen, and at the same time give a better expression to the amount of limitation in value of the tests themselves. The third paper, 'On a case of delirium produced by bromides,' gave a clinical description of a patient whose mental condition was due to the indiscriminate prescription of sedatives which have usually been considered harmless. The work on this case was done in conjunction with Dr. Mary O'Malley, woman physician.

"6. During the year an investigator in the George Washington University has under my direction conducted a series of experiments upon the action of various salts upon the action of the heart. This work has little direct bearing upon the problems of insanity, but may be considered helpful in that it adds to our store of knowledge regarding certain physical derangements that may be caused by preservatives in meat and in other foods. The work has been published in the American Journal of Physiology. The title is 'F. C. Cook: The effects of chloride, sulphate, nitrate, and nitrite radicles of some common bases on the frog's heart.'

"7. For my researches on the function of the association areas of the cerebrum, a topic closely allied to the study of abnormal mental

states, a graduate student in the George Washington University has been training monkeys, and these animals are to be utilized for experiments upon various areas of the brain, to determine, if possible, in which parts of the brain certain complex mental processes take place. The animals now on hand will probably be used for the investigation of the functions of the occipital lobes. It is supposed, although at present no direct experimental evidence is at hand to uphold the view, that in the occipital region of the brain a small area is concerned with what may be called sensory processes, and that surrounding this region is another which is concerned with the perceptual aspect of vision. The experiments that have been planned are expected to elucidate this problem.

"The work performed by the student to whom reference has been made is now being collated and it is expected that he will be able to take the facts regarding the rapidity of the acquirement of habits, etc., and prepare therefrom an account of the mental processes in monkeys. This part of the work will be prepared by him for presentation to the university as a thesis for the degree of doctor of philosophy.

"8. Work on buried complexes has been continued, but as yet no publishable results have been obtained.

"9. No additional work on memory in arteriosclerotic dementia has been done, and the pressing demands of the other work have prevented the collation of the results already obtained for the formation of an article on this subject.

"10. Work has been done toward the elaboration of the scheme of the mental examination of the insane, and if suitable arrangements for publication can be made, it is expected that this work will be ready for publication at some time during the coming year."

PATHOLOGICAL LABORATORY.

The pathologist reports as follows: "During the past year the pathological work has been placed upon a somewhat different basis, a closer relation to the clinical branch being inaugurated. To this end much attention has been given by Doctors Hough and Achúcarro to serum and cyto-diagnosis of the cerebro-spinal fluid obtained by lumbar punctures, and to the recognition of paresis and cerebral syphilis by Wasserman's reaction. Some experimental work on animals has been done with a view to determining, if possible, the origin and function of some of the cellular elements and the proportion of proteid contents in the fluid in health and disease. Doctor Achúcarro has been doing excellent work in the study of the nervous system by histological and experimental work, as his report will show.

"The laboratory is now well equipped with apparatus and instruments, the principal addition being a Leitz freezing microtome, two Zeiss apochromatic objectives, two Zeiss compensating oculars, and a complete outfit of apparatus for the serum and blood work.

"The number of post-mortem examinations made far exceed that of any previous year. One hundred and sixty-four autopsies have been held, in nearly every instance complete. The value of such a large number of post-mortems to the clinician, as well as the specialist, should not be underestimated, and as a rule the autopsies have

been well attended by the members of the clinical staff. One hundred and twenty-eight of these cases were males; 36 females.

"The mental diseases of the cases examined were as follows: Senile dementia, 49 cases; dementia præcox, 18; epileptic insanity, 16; paresis, 16; chronic dementia, 13; arterio-sclerotic dementia, 10; manic depressive insanity, 7; chronic melancholia, 6; organic dementia, 5; chronic mania, 4; exhaustion psychosis, 4; terminal dementia, 3; toxic alcoholic psychosis, 2; presenile dementia, 2; syphilitic dementia, 2; imbecility, 2; and acute mania, melancholia agitata, dementia from Huntingdon's chorea, myxœdematous insanity, and alcoholic polyneuritis, of each 1 case.

"Owing to the advanced age of many of our patients, the senile forms of mental disease and the correlative arterial changes are extremely common. In 106 cases an appreciable degree of arteriosclerosis of the cerebral vessels was present, and in 55 of these cerebral softenings had been produced. In a very few instances softenings were found not clearly attributable to arteriosclerosis, probably of syphilitic origin. In 6 cases cerebral hemorrhage had resulted, 2 of these being of the meninges. There were 20 cases of pachymeningitis interna, meningo-encephalitis, in all of the cases of paresis, and 1 case of leptomeningitis due to the colon bacillus, introduced to the circulation by a suppurative cholecystitis. There was 1 case of gumma of the brain; 3 of solitary tubercle; 1 tumor of the hypophysis; 2 small tumors of the dura mater, and 2 cases of cerebellar atrophy and sclerosis. There were a number of instances in which sclerosis of some part of the brain was found, usually of the hippocampus in epilepsy; 1 case of posterior sclerosis of the cord in tabetic paresis. There were among the arterial anomalies 11 instances of a median anterior cerebral artery.

"In 155 cases in which the weight of the heart was taken and the valves studied, 66 cases presented sufficient valvular disease to cause some incompetency of the tricuspid valve; 10 of mitral incompetency alone; 7 of mitral stenosis, and 6 of aortic stenosis. Of the combined forms were 2 of mitral and tricuspid insufficiency and aortic stenosis; 17 cases of mitral and tricuspid incompetency; 1 of mitral incompetency and aortic stenosis, and in the latter an aneurism of one of the aortic segments. It must of course be understood that in almost all of the above-enumerated cases valvular changes were present in other sets of valves, though not enough to impair their function. In 33 of the 155 cases the organ weighed over 400 grams; in 10 of these it weighed over 500 grams; in 4 over 600 grams; and the largest weighed 690 grams. Besides the valvular diseases, there were 11 cases of chronic interstitial myorcaditis; 2 of acute pericarditis; 7 of chronic adhesive pericarditis; 1 case of rupture of the arch of the aorta into the pericardium, 6 aneurisms of the aorta, and 1 case of secondary hypernephroma in the wall of the left ventricle.

"The diseases of the respiratory system were 8 cases of pulmonary tuberculosis alone; 22 cases of pulmonary tuberculosis with intestinal ulceration, and 29 cases of latent and obsolete tuberculosis of the apices indicated by old scars of the pleura and lungs. In many of the cases of active tuberculosis the process had become more or less generalized; there were, however, 1 case of apparently primary tuberculosis pleuritis, and 1 of chronic tuberculous peritonitis with

only limited and latent pulmonary foci. There were 17 cases of broncho-pneumonia, in most instances of hypostatic origin; 4 of lobar pneumonia; 5 of pulmonary gangrene; 3 of thrombosis of pulmonary artery with hemorrhagic infarcation; 2 pulmonary abscesses; 1 of chronic pneumonia following catarrh of lung, and 2 instances of secondary hypernephroma deposits of lungs.

Analysis of deaths due to tuberculosis for fiscal years ended June 30, 1885-1909.

Date.	Deaths.	Post-mortem examinations.	Cases not examined, post-mortem.	Deaths due to pulmonary tuberculosis.	Well-marked tubercular cases, post-mortem.	Cases of latent or limited pulmonary tuberculosis found in autopsies.	Total of pulmonary tubercular cases examined, post-mortem.	Cases of tuberculosis among those not examined by autopsy, based upon clinical diagnosis.	Total of all cases of death with pulmonary tuberculosis, clinical and post-mortem.	Percentage of tubercular cases among those that died, recognized clinically and at autopsy.	Percentage of those examined post-mortem which showed tubercular lesions.	Cases which died of other diseases than tuberculosis.
1885	105	69	36	13	18	3	21	2	23	21.9	30.4	92
1886	102	72	30	24	26	1	27	8	35	34.3	37.5	78
1887	92	49	43	13	9	1	10	9	10	20.6	20.4	79
1888	120	79	41	14	14	6	20	8	28	23.3	25.3	106
1889	114	67	47	23	19	3	22	10	32	28.0	32.8	91
1890	140	108	32	20	22	10	32	6	38	27.1	29.6	120
1891	128	79	49	21	13	5	18	13	31	24.2	22.7	107
1892	153	96	57	13	13	9	22	9	31	20.2	23.0	140
1893	181	117	64	22	34	9	43	8	51	28.1	36.7	159
1894	167	115	52	28	27	13	40	13	53	31.7	34.7	139
1895	179	125	54	18	20	6	26	11	37	20.6	20.8	161
1896	187	119	68	21	23	11	34	12	46	24.6	28.5	166
1897	162	90	72	13	15	4	19	9	28	17.2	21.1	149
1898	197	85	112	19	17	3	20	14	34	17.6	23.5	178
1899	193	81	112	31	22	3	25	20	45	23.3	30.8	162
1900	184	94	90	25	17	6	23	10	33	17.9	24.4	159
1901	226	109	117	31	27	14	41	16	57	25.0	37.8	195
1902	177	92	85	19	20	7	27	7	34	29.3	29.0	158
1903	258	125	133	36	25	18	43	15	58	22.5	34.4	222
1904	243	103	140	28	15	5	20	13	33	13.6	19.4	215
1905	236	114	122	28	18	6	24	12	36	15.2	21.0	208
1906	202	114	88	29	18	11	29	11	40	19.8	25.4	173
1907	216	128	88	33	16	15	31	17	48	22.2	24.2	184
1908	201	128	73	14	12	15	27	4	31	15.4	21.0	187
1909	255	164	91	38	30	29	59	9	68	26.6	35.9	217
Total	4,418	2,522	1,896	574	490	213	703	266	969	22.8	27.6	3,845

"The noteworthy lesions of the liver were 6 cases of common cirrhosis; 5 of calculous cholecystitis; 1 of suppurative cholangitis; 1 of primary cancer; 2 of secondary cancer; 2 of secondary hypernephroma; 1 subphrenic abscess, and 1 of dropsy of the gall-bladder due to calculous obstruction of the cystic duct.

"The kidneys showed the usual large proportion of chronic interstitial changes due to old age and arteriosclerosis. It seems probable that this condition has much to do with impairment of the general health and that not infrequently it is the direct cause of death, though 3 deaths were attributed to this alone. In 8 cases the organs were better described by chronic diffuse nephritis of the parenchymatous type, and in the septic and toxic conditions parenchymatous changes were commonly found. There were 21 cases of cystitis, with extension to the kidneys in about half; 1 case of calculous abscess of the kidney, and 1 of tuberculosis pyelo-nephritis. There was 1 case of perforating ulcer of the fundus of the bladder causing peritonitis, and 1 of a single large urinary calculous which had finally

caused violent catarrhal cystitis. Two large renal hypernephromata with extensive metastases were found; 1 of adrenal hyperplasia with fatty degeneration; and 2 cases of adrenal tuberculosis, in one, followed by Addison's disease.

"The principal diseases of the alimentary canal were 22 cases of tuberculosis ulceration; 6 of colitis; 2 of gangrene of the bowel from thrombosis of arteries; 1 cancer of oesophagus; 1 cancer of stomach; 2 gastric ulcers, in one instance with perforation and peritonitis, and 1 case of chronic coprostasis and peritonitis.

"*Epilepsy.*—In the work of the year the study of the morbid anatomy of 200 cases of epilepsy was completed, this being the number of cases examined since the establishment of the department. A brief résumé of some of the principal points may be given. In 19 cases death occurred in *status epilepticus;* in 47 cases death followed a series of convulsions. There were 94 cases of arteriosclerosis with cerebral softenings in 49, while death was attributed to these conditions in 15 instances. There were 31 cases of pachymeningitis interna, deemed of sufficient gravity to cause death in 4; 6 deaths were attributed to cerebral hemorrhage; 21 to pulmonary tuberculosis; 6 to pneumonia; 3 to typhoid fever; and 4 died from accidental asphyxia from food in the larynx.

"Many of the patients were well advanced in years: Nine were over 75 years; 20 over 70; 65 over 60; and of the whole number 105 were over 50 years of age. In many instances the patients had long survived the disease; in some the epilepsy was late in its development, while in some the organic changes present as the result of arteriosclerosis and old age were doubtless the cause of the convulsive seizures. The brains in cases of early epilepsies weighed well. In 39 cases the brain was over 1,400 grams in weight, equal to and above the normal weight for adult males; in 75 cases the weights were within the normal range for males, and in 10 of the 27 females the brain was within the normal range for female brains. There were, however, 84 cases in the whole number in which the brain averaged about 100 grams less than the normal. The heaviest brains weighed 1,760, 1,590, 1,585, and 1,566 grams; the lowest weights were 834, 970, 977, and 984 grams. Sclerosis of some part of the encephalon, most commonly of the hippocampus, was present in 19 cases; tumors of the brain in a few instances. Numerous interesting conditions of the brain were found which can not be here given.

"In connection with muscular overstrain due to the convulsions, hypertrophy of the heart and valvular disease were very frequent. In 83 cases the heart weighed over 340 grams, the maximum prevailing weight for adult males, and in 6 of the 23 female hearts weighed, the weight was over 283 grams, the maximum prevailing weight for females. There were 17 cases in which the organ was over 500 grams in weight. Owing to the fact that in 49 cases the heart weighed less than minimum for males, and in 8 females below the minimum weight for females, the general average was only 306 grams. In 110 cases the valves showed an appreciable degree of change, while there was simple relative incompetency of the tricuspid valve in 9 cases.

"The skull was thicker than usual in 68 cases; there were, however, 58 negroes in whom the average thickness is a little greater than in the white races. In 75 cases the thickness was normal; in 36 it was

rather thinner than the average. In a few cases the shape was noticeably abnormal, due to premature union of the sutures.

"The study of the other organs revealed many very interesting conditions, some of which may have been the reflex factors in the nervous affection, though this must be merely conjectural.

"*Clinical pathology.*—The clinical work in serum and cytological study embraced 66 specimens of cerebrospinal fluid from 52 patients, as follows: Seventeen cases of general paralysis; 2 cases of juvenile paresis; 1 case of paresis with tabes; 12 cases of cerebral syphilis; 6 of dementia præcox; 5 of toxic exhaustion psychosis; 2 of senile dementia; 2 of organic dementia; and of cerebral embolism, acute leptomeningitis, melancholia agitata, idiocy and not insane, of each, 1 case. All of the specimens were examined cytologically and chemically, and 12 of the recent ones serologically, for evidence of syphilis, by the Wasserman method. Some of the cases were examined both before and after death, and several twice during life.

"During the year there were 702 urinalyses made. No disease indicated in 389; nephritis in 124; cystitis in 108; slight albuminaria in 48; hematuria in 2; sugar in 1; passive hyperæmia in 6, and pyelitis in 1.

"Sputum was examined 121 times; negative for tubercle bacilli in 92 cases; positive in 29 cases.

"Blood was examined for the malarial parasite 84 times; positive for malaria, 18 cases.

"The stomach contents were examined 3 times; cancer was discovered in 1 case; chronic gastritis in 1 case, and negative in 1 case.

"Several specimens of fæces were examined, resulting in the finding of 2 cases of infection with tænia saginata, and 1 of uncinariasis. In these cases urethral discharge resulted in discovery of gonorrhea in 2 cases; simple erethritis in 1 case.

"*Photography.*—The photographer reports that during the year 86 miscellaneous photographs were taken, the most of which were for the use of the pathological department, and 555 portraits of patients for the ward records. Twelve new bromide enlargements have been added to the hospital collection, and about 40 lantern slides for use of the members of the staff."

HISTOPATHOLOGICAL LABORATORY.

The histopathologist reports as follows: "I started my work as histopathologist of the hospital on October 18, 1908. About one month after a technical assistant was appointed, who assists me in my work. This assistant was completely untrained, but she has proved to be able to do the most of the mechanical routine work, and actually knows the elemental operations of histological technique for the nervous system and can carry out in a satisfactory way more than ten ordinary methods of staining.

"The aim of my laboratory work has been the histological brain examination of most of the cases on which an autopsy was performed in order to help the post-mortem macroscopical diagnosis, and to do research work upon the cases in which interesting facts were found in the preliminary examination.

"The instruments at our disposal have been increased and improved, and especially I mention the acquisition of a freezing microtome, which enables us to perform early diagnoses on pieces just

obtained in the autopsy, and to carry out several important histological methods for the brain examinations which could not be accomplished by other means.

"The arrangements for keeping animals for experimental purposes have also been of much use in the execution of a certain amount of this kind of work. The amount of post-mortem material at my disposal has been very large. In fact, I have attended and assisted in some way at 120 autopsies. Of many of the brains pieces from different convolutions, from the cerebellum, from the chord, etc., were taken. The brains not studied histologically were mostly not fit for this purpose, on account of it being impossible to perform the autopsy for many hours after death. As a rule I do not take pieces for examination when the time after death exceeds twenty-four hours. Only cases of special interest are examined under such conditions. Besides the fresh material, several brains have been examined which came from autopsies previous to the date I started my work.

"Ninety-four brains have been more or less examined by myself. This figure comprises, according to the clinical diagnosis, the following: Paresis 9, cerebral syphilis 2, senile dementia 28, arterio-sclerotic dementia 2, post-apoplectic dementia 2, dementia præcox 14, chronic dementia 4, dementia 2, manic depressive insanity 3, paranoid state 1, Korsakoff's psychosis 1, acute melancholia 1, imbecility 1, idiocy 1, epilepsy 10, chronic mania 1, toxic exhaustion psychosis 1, presenile dementia 1, melancholia 1, tubercular lesions of the brain 2, juvenile paralysis 1, pieces of brain from an operative case 1, brain of a normal individual executed in Washington 1. A general comparative study of this material will be prepared for the next year.

"The great percentage of senile and arterio-sclerotic cases have been studied by me with a certain care, by means of the silver methods of Cajal and Bielschowsky for the demonstration of neurofibrils and fine axiscylinders. The patches of necrosis with enlargements of the axiscylinders which have been described lately and which have been interpreted as being essential histological changes of senile dementia, have been found in several of our cases, but not in all those in which the clinical diagnosis was senile dementia. The greatest amount of these miliary lesions and the most developed ones have been found in a case of the so-called 'senile cortical devastation,' in which the importance of arteriosclerotic small softenings was a very considerable one. The attempts I made for getting a deeper understanding into the nature of the necrotic patches, by means of a rather unessential modification of the Cajal method, which, however, allows a good counter staining, have shown the presence of degenerative products in the patches. These products may possibly account for the formation of the plaques. Other methods have shown also that some of the enlargements reported to belong to the axiscylinders are rather of neuroglic origin. In connection with these patches the special lesion of the endocellular neurofibrils described by Alzheimer was found in several cases. We have noticed the fact that the silver method of Bielschowsky (which shows these lesions) stains under not well-known circumstances not only the nervous fibrils but also the neuroglic, and the connections with neuroglic cells of the above-mentioned lesions led us to believe that probably the nature of these changes is different from that thought at first. This study, which is almost finished, will be the subject of another paper.

"In two cases of senile dementia I have found a special form of ependymitis, to which very little attention has been given heretofore in the literature. A careful histological examination of these lesions never was made before, so that the nature of the plaques was misunderstood. We had found the same changes twice in our former experience, and our actual study of these in all four cases has proven the plaques to be due to a hyperplastic development of sclerotic nature in the blood vessels situated immediately underneath the ependymal layers. This study with nine illustrations is now in press and will soon appear in the Travaux, published by Prof. Ramony Cajal.

"In connection with Doctor Blackburn I have started the histological study of three cases of epilepsy which showed localized areas of atrophic sclerosis of the brain cortex. In those three brains of apparently similar aspect, two different pathological processes could be isolated. Two of these belong to the true forms of microgiria, while the other one owes its macroscopical appearance to a very different process, suspected by us to be of syphilitic origin. Some of the drawings illustrating this study are already done, and the paper is to be published with Doctor Blackburn.

"One of the cases with the diagnosis of chronic dementia showed at the autopsy a very marked purulent meningitis, extending over the whole surface of the brain. At the histological examination of the piamater, we found an extensive infiltration, consisting of polymorphonuclear leucocytes and of exceptionally large macrophages. A large bacillus was found which was identified as coli bacillus. The fact that coli bacillus meningitis being rare, the exceptional development of the macrophages and the lack practically of any extensions of the inflammatory process into the cortex, which fact we attributed to the development of a very thick layer of neuroglia in the surface of the brain, owing to the chronic demential disease of the patient, seemed interesting. The paper, illustrated by six colored drawings, was read at one of the meetings of the Society of Nervous and Mental Diseases in Washington.

"In the paper I wrote for Bulletin No. 1 of the hospital I tried to show that the aim of histopathological studies in psychiatry is not the attempt at explanation of the peculiarities of mental disturbances by means of anatomical facts, but the isolation of constant histopathological complexes in the brains of mental patients independent or not of the clinical pictures, in order to improve classification. The results of this kind of work show already an immediate diagnostic value. I pointed out also the principal lines of research along which new findings are now obtained in brain histopathology. This paper was prepared for a lecture and was illustrated by eighteen lantern slides of drawings I made from my own preparations.

"I have under way an experimental study on rabbits and guinea pigs which aims to develop an idea sketched by me in a previous publication. Special morphological features (Stäbschenzellen e. g.), presented by the interstitial elements of the central nervous system in pathological conditions, were suspected by me to be in many cases an expression of the great plasticity of these interstitial elements in adapting themselves to the neighboring nervous structures in some way pathologically impaired. Furthermore, this adaptation could be

explained as an advantageous reaction shown by the interstitial elements in the elaboration of the disintegrative substances of the nervous structures.

"The Ammon's horn convolution by its peculiar structure showed itself to be an especially adapted object for experimentation as to this problem. By exposing the Ammon's horn in rabbits and guinea pigs and injuring in different ways the nervous structures we have obtained morphological reactions in the interstitial cells which correspond extensively to the organization of the nervous elements. This problem bears a general interest for the pathology of the nervous system, and this fact, quite as much as the results obtained, may justify further experiments.

"In this period of time my work on rabies has appeared in the Histopathologische Arbeiten, published by Professor Nissl in Heidelberg. This experimental study has been carried out in the laboratory of the psychiatrical clinic of Munich. It is an article of 58 pages, with 8 colored plates and microphotographs, which studies the pathology of rabies in the central nervous system by the modern histological technique. The fact that some of the pathological peculiarities of this process make it similar to general paralysis is interesting for the pathology of mental disease.

"Besides his other occupations in the pathological department, Doctor Hough has carried out two pieces of work, largely of histological character, which perhaps therefore should be mentioned here. The histological part of his article on "Cerebrospinal fluid" has been accomplished by means of the Alzheimer and the Fuchs Rosenthal methods, which have proved to be a considerable methodological advance. His other article, which has been accepted for publication by the Journal of Nervous and Mental Diseases, deals with the study, both clinically and histologically, of a case of juvenile paresis which showed histological evidences of special arrest of development in the nervous system. I was very much interested in the problems studied by Doctor Hough, and tried to assist him as much as I could in his histological work, as well as by the drawing of the illustrations for his articles. As a whole, I think that the histological laboratory studies the different fields of brain histology, especially regarding insanity, with the up-to-date technique. Perhaps it could be said that we do not study here the degenerations of cerebral paths as it is done by serial sections of the whole brain. This study can not really be called disconnected with psychiatry, but it is rather a complement of the neurological studies. I think, however, that it could be a matter of consideration, whether it is necessary for us to start this kind of work, for which accomplishment only the acquisition of a special microtome should be needed. The modern studies of Cytoarchitektonik of the brain could then also be carried out with this instrument.

"I am especially obliged for assistance to Doctor Blackburn, who gave me every opportunity in my work and much scientific advice; to Doctor Franz for knowledge, scientific advice, and even for help in the translation of a part of my article in the Bulletin (Miss Sackmann, librarian, helped me also in the work); and to Doctor Hough for assistance he was always ready to afford in the daily laboratory work."

PUBLICATIONS.

The following publications by members of the hospital staff have appeared during the year:

By William A. White, M. D., superintendent:
- Expert Testimony and the Alienist. (New York Medical Journal, July, 1908.)
- The Sphere of the Physician in the Community. (Address to the graduating class, Georgetown University Medical College. Georgetown College Journal, July, 1908.)
- The Theory of the Complex. (Interstate Medical Journal, vol. 16, No. 4, 1909.)

By Shepherd Ivory Franz, A. B., Ph. D., psychologist:
- On the Development and Needs of Modern Psychiatry. (Bulletin Ontario Hospitals for the Insane, vol. 2, pp. 40–62. July, 1908.)
- A Case of Polyneuritis, etc. (With Mary O'Malley, M. D.) (See below.)
- The Knee Jerk in Paresis. (American Journal of Insanity, vol. 45, pp. 471–498. January, 1909.)
- Sensations following Nerve Division. I. Pressure-like Sensations. (Journal of Comparative Neurology and Psychology, vol. 19, pp. 107–123.)
- Sensations following Nerve Division. II. Sensibility of the Hairs. (Journal of Comparative Neurology and Psychology, vol. 19, pp. 215–223. June, 1909.)
- Sensations following Nerve Division. III. Temperature Sensations. (Journal of Comparative Neurology and Psychology, vol. 19, pp. 223–235. June, 1909.)
- Pellagra (review). (Journal of Philosophy, Psychology, and Scientific Methods, vol. 5, pp. 613, 614.)

By I. W. Blackburn, M. D., pathologist:
- Illustrations of the Gross Morbid Anatomy of the Brain of the Insane. (Pp. 155; illustrations, 75. Government Printing Office, 1908.)

By Nicolas Achúcarro, M. D., histopathologist:
- Sur la formation de cellules à bâtonnet (Stäbschenzellen), etc. (Travaux, etc., publiés par le Dr. S. Cajal. August, 1908. Madrid.)
- Zur pathologische Histopathologische der Zentralnervensystems bei Tollwut. (Histologische und Histopathologische Arbeiten. 1909. Vol. III.)

By Mary O'Malley, M. D., assistant physician:
- Address to Members of the Graduating Class of Nurses for the Insane at Norristown State Hospital, Norristown, Pa. (Woman's Medical Journal, September, 1908.)
- A Case of Polyneuritis of Autotoxic Origin, with Korsakow's Syndrome; with Report of Autopsy and Microscopical Findings; and Shepherd Ivory Franz. (American Journal of Insanity, vol. 45, pp. 279–291. October, 1908.)

By Monie Sanger, steward:
- Should "Factory" show a profit? (Bookkeeper Magazine, March, 1909.)

NEEDS OF THE HOSPITAL.

The appropriations recommended for the fiscal year 1910–11 are as follows: For the support, clothing, and treatment in the Government Hospital for the Insane of the insane of the Army and Navy, Marine Corps, Revenue-Cutter Service, inmates of the National Homes for Disabled Volunteer Soldiers, persons charged with or convicted of crime against the United States who are insane, all persons who have become insane since their entry into the military service of the United States who have been admitted to the hospital and who are indigent, including purchase, maintenance, and driving of necessary horses and vehicles, and of horses and vehicles for official use of the superintendent, for the indigent insane admitted from the District of Columbia, and nonresident insane persons under temporary care, the sum of $640,200. This amount is based on 2,910 patients at $220 per capita. This number is arrived at by estimating the probable increase on the basis of what the increase has been in past years. Pursuing the same method of calculation for the District of Columbia patients, their share is $312,400, leaving $327,800 to be provided for in the sundry civil bill.

For expenses in returning escaped patients to the hospital the sum of $1,500 is needed to be set apart. A decision of the comptroller prevents the payment of these expenses out of the support fund of the hospital and makes it necessary that a special appropriation be made for this purpose.

The usual authority should be given in the sundry civil bill to use $1,500 in defraying the expense of removal of patients to their friends on leaving the hospital.

A further provision in the same bill is necessary authorizing the sum of $1,000 to be used in the purchase of books, periodicals, and papers for the use of the hospital and for the medical library.

For roadways, walks, and grading $5,000 is necessary for making the necessary repairs and renewals.

For general repairs and improvements the sum of $40,000 is needed.

For the construction and equipment of an epileptic group to accommodate 140 patients, $160,000 is needed.

The hospital has been increasing rapidly in size lately, and the thousand beds for which the hospital extension was constructed are already filled. In certain portions of the hospital we are beginning now to see evidences of crowding. It is therefore the part of wisdom to provide for further growth, and in making this provision it is deemed desirable to build such extensions as will enable a better classification of the hospital population. Whereas the epileptics are at present fairly well segregated, they are in wards that were built for a different class of patients. The buildings of an epileptic group can be so constructed as to admit of indefinite extension, and will give this class of patients a character of surroundings much better suited to them than they now have, while the wards they now occupy can be used for the general purpose of the hospital population. The estimated cost on a basis of $1,000 per capita is considered under all conditions to be reasonable, while $100 per capita has been allowed for equipment. The additional $6,000 is intended to include the cost of the plans, the architects' fees, advertising, etc.

To enable the Secretary of the Interior to purchase additional land for the Government Hospital for the Insane, $100,000, or so much thereof as may be necessary. In the event of his inability to make such purchase, the Secretary of the Interior shall proceed in the manner prescribed for providing a site for the Government Printing Office, in so much of the act of July 1, 1898, as is set forth on pages 648 and 649 of volume 30 of the Statutes at Large, to acquire the land desired; and for the purpose of such acquisition the Secretary of the Interior shall have and exercise all the power conferred upon the Public Printer in such act. The appropriation to be disbursed by the Secretary of the Interior. The need of additional land by the hospital has been appreciated for some time and each successive superintendent for many years past has requested appropriations for its purchase. The need of land has become more acute of late because all of the new construction has been placed upon land previously used for farming purposes, thus restricting the output of the farm to such an extent that it is now impossible to raise enough fodder for the dairy herd. The hospital is increasing in size at the rate of upward of 100 patients per annum, and more buildings must be added in the near future, which will still further infringe upon the land used for farming.

For a new dairy barn, together with the necessary roadways and grading, and the extension of heat, light, and water systems, $50,000.

The present buildings, comprising the barns, piggery, and hennery, are located on the east side of Nichols avenue and immediately fronting on it. Most of these buildings are very old and in a dilapidated condition. One of these barns constantly requires repairs.

A recent investigation of the dairy by an expert from the Agricultural Department showed it in a very unfavorable light, and indicated very clearly that steps should be taken to improve the conditions. This can only be done in a satisfactory and economical manner by constructing a new plant. It is believed that with the present agitation of the milk problem in the District, which is resulting in investigations along the broadest possible lines, it would be advantageous, from many points of view, for the Government to take the initiative in constructing a model and up-to-date dairy plant. There is only one other plant in the District owned by the Government, namely, the Soldiers' Home, which is at the other extreme of the District; and the plant at this hospital is in very poor condition. I believe it should be put in the best condition possible for the reasons above stated, in addition to the fact that it is of the highest importance that such an important and staple article of diet in the hospital as milk should be of the best quality—fresh, and free from any suspicion of disease. For doing this work, as stated above, $50,000 will be required. I secured the hearty cooperation of the Agricultural Department (to which I desire to extend my thanks) in preparing plans for a model dairy. Its experts have been over the situation and plans have been drawn in the Department and estimates prepared of the cost of construction. It will therefore be possible to go to Congress with the most approved plans for this type of building.

For new entrance and gatehouse, $8,000 is needed. The building of the hospital extension, with the location of the offices in the new administration building, has removed the center of the institution from the old main building to the present administration building, and makes it desirable to provide a new main entrance at the northern extremity of the administration group.

For an iron fence to be placed along the frontage of the hospital grounds on the east side of Nichols avenue the sum of $14,000 is needed. This portion of the hospital grounds is occupied by four buildings of the hospital extension, which contain approximately 350 patients. There is now along the thoroughfare a dilapidated, unsightly wooden fence, which it is desired to replace with a substantial iron one.

MEDICAL STAFF.

Separations.—Dr. Lucien C. Smith, medical interne (as special attendant), resigned August 10, 1908, having been appointed as assistant surgeon, National Home for Disabled Volunteer Soldiers, Hampton, Va.; Dr. Harry R. Hummer, assistant physician, resigned September 30, 1908, to become the superintendent of the Canton Hospital for the Insane, Canton, S. Dak.; Dr. Clarence R. Bell, medical interne, resigned November 30, 1908, to accept a position in the Illinois General Hospital for the Insane, Peoria, Ill.; Dr. Arthur C. Fitch, junior assistant physician, resigned January 31, 1909, to

accept a position in the medical service of the Madeira-Mamore Railway Company, with headquarters at Porto Velho, Brazil; Dr. George M. Gehringer, medical interne, resigned January 31, 1909, having secured a position in the Flushing Hospital and Dispensary, Flushing, N. Y.; Dr. Lawrence M. Drennan, medical interne (as special attendant), resigned March 2, 1909; Dr. Erwin E. Downing, dental interne, resigned June 23, 1909, in order to enter private practice.

Promotions.—Dr. Alfred Glascock was promoted from junior assistant physician to assistant physician October 1, 1909, vice Dr. Harry R. Hummer, resigned.

Appointments.—Dr. Erwin E. Downing, dental interne, August 15, 1908; Dr. Harry Sicherman, medical interne, August 21, 1908; Dr. George M. Gehringer, medical interne, September 1, 1908; Dr. Eva C. Reid, medical interne, December 9, 1908; Dr. Larry B. McAfee, medical interne (as special attendant), February 5, 1909.

On September 21, 1908, Dr. Henry W. Miller was appointed as clinical director, vice Dr. Charles H. Clark, who resigned to take charge of the State Hospital at Cleveland, Ohio. Doctor Miller is a graduate in medicine of the University of Toronto, Canada, and has been a naturalized citizen of the United States since 1902. After two years' post-graduate study he filled successively the position of junior assistant physician at the insane hospital at Worcester, Mass., assistant physician at the McLean Hospital, Waverly, Mass., pathologist at the insane hospital, Taunton, Mass., and finally psychopathologist at Cook County institutions, at Dunning, Ill., from which position he came to this hospital.

On October 19, 1908, Dr. Nicolas Achúcarro was temporarily appointed to the position of histopathologist of the central nervous system. Doctor Achúcarro is a subject of Spain, and a physician of the Provincial Hospital of Madrid, and comes to this position with the permission of his Government. His preliminary education and baccalaureate degree was received in Bilbao. His subsequent studies were carried out largely in Germany. He studied at Real-Gymnasium of Wiesbaden, at the University of Marburg, and received his degree of Licenciado en Medicina from the faculty in Madrid. His subsequent work on the nervous system was done at the Hospice de Bicêtre in Paris with Prof. Pierre Marie; at the Psychiatric Clinic of Florence with Profs. Eugenio Tansi and Emerto Lugaro; at the Psychiatric Clinic of Munich with Professor Kraepelin and Doctor Alzheimer. He has made several contributions already on the subject of the histopathology of the nervous system.

Assignments.—On May 20, 1909, Dr. Robert L. Richards, of the army, was assigned to duty in this hospital by the Surgeon-General. The immediate cause of this assignment was the appreciation by the Surgeon-General of the need of a physician skilled in psychiatry who should be stationed at the Presidio, San Francisco, where so many insane persons are received in transit to this institution, and where a special pavilion has been built for their care. It is hoped that Doctor Richards's close contact with the problem of insanity in connection with the army will develop other avenues of usefulness for physicians trained in psychiatry. Some means should be taken that will reduce to a minimum the number of enlistments of men who are liable under slight stress to become insane, and as a result become an indefinite burden on the Federal Government for their care.

MISCELLANEOUS.

APPOINTMENT OF DISBURSING OFFICER.

By an act of Congress approved February 2, 1909, amending section 4839 of the Revised Statutes, the appointment of a disbursing officer for the hospital was provided for. On March 16, 1909, Miss Alice M. Hardy was appointed to this position by transfer from the position of chief clerk.

TRAINING SCHOOL FOR NURSES.

The hospital graduated the usual number of nurses this past year. We never, however, have been able to fill the positions in the institution with graduate nurses that ought to be filled by nurses. The classes are not large enough to supply the demand. Efforts are being made, and will be made more strenuously during the coming year, to induce attendants to enter the training school.

It is believed that this hospital should supply all the needs for the care and treatment of the insane in the community, and among those needs the supplying of nurses trained as mental nurses for private work when required. Several times during the past year we have been called upon to do this, and have been able to, although frequently at some sacrifice owing to the small number of nurses that we have on duty. We hope in the future to be able to train a much larger number, so that as the community may wish from time to time to be supplied we will be able to meet the demands.

EVENING STAFF MEETINGS.

During the year a series of evening staff meetings was projected. At these meetings it was my object to get the medical force of the hospital together, and to have papers, especially by the members of the scientific department, that would place the general staff in possession, in a general way, of the results of their work and thought. To these meetings also I invited the medical profession of the city of Washington. This was done to get the profession in touch with our work, so that we might secure their intelligent cooperation and understanding. It is felt that there is a great necessity for a wider appreciation not only on the part of the public, but on the part of the medical profession, of the problems of psychiatry.

These evening staff meetings were well attended by physicians from the city, who took a great interest in the papers read, and entered actively into their discussion.

BULLETIN NO. 1.

As a result of the staff meetings mentioned above, a hospital bulletin intended to contain the results of the scientific work of the hospital was projected. The first number of this bulletin, containing the papers presented at the evening staff meetings, is now in press and will contain the following papers: (1) The relation of the hospital for the insane to the medical profession and to the community, by William A. White, M. D. (2) The present status of psychiatry in America, by Henry W. Miller, M. D. (3) The morbid anatomy of mental disease, by I. W. Blackburn, M. D. (4) The functional view of the insanities, by Shepherd Ivory Franz, Ph. D.

(5) The standpoint of histopathology in the study of mental disease, by Nicolas Achúcarro, M. D. (6) The use of association tests in determining mental contents, by Shepherd Ivory Franz, Ph. D., and William A. White, M. D. (7) A case of unilateral hallucinosis (alcoholic), by William A. White, M. D. (8) A case of delirium produced by bromides, by Mary O'Malley, M. D., and Shepherd Ivory Franz, Ph. D. (9) The cytological examination of the cerebrospinal fluid, by William H. Hough, M. D.

This bulletin is put forth as an effort toward fulfillment of what is conceived to be the true position of a hospital for the insane, that: It should not only be a center for psychiatric information, but a center for the distribution of that information.

GENERAL CONSIDERATIONS.

Certain general considerations affecting the growth and the policies of the hospital were discussed at length in the last annual report. They are of such great importance, however, that I am prompted to quote passages from that discussion here.

"*Additional accommodations.*—We are thus approaching already a condition of crowding in the hospital, a condition the evils of which we know only too well, because we have so recently escaped them. I may say, I think, without fear of contradiction, that crowding in an institution of this character is of all single evils perhaps the greatest. It interferes in every way with the highest efficiency in the care and treatment of patients, and brings about those contions of stir-up and unrest among the population that gives rise to all the petty disturbances and annoyances that keep an institution constantly in a turmoil of complaints. I may mention a single condition from which the institution has been free now for over two years, very largely, I believe, from the lack of overcrowding. I refer to the fact that during this period of time there has not been a single suicide in a population aggregating over 3,000 patients each year. Unless, therefore, some consistent scheme of expansion is formulated for the future we are threatened with all of these evils which impair the efficiency of an institution of this sort.

"In the first place, with the present condition of the hospital regarding population, and with the reasonable expectation of a continued 100 per annum increase, it is time to consider the question of providing additional buildings. In order to provide additional accommodations to the best advantage in a growing institution of this sort it would seem best to begin the construction of colonies for separate classes of patients. The first one that would naturally be considered at this time is an epileptic colony. There are at present in the hospital approximately 150 epileptics. Of this number, the white women are well housed in an appropriate building. The white male epileptics are provided for in wards set aside for that purpose which, however, were not specially constructed for this class of patients. It would therefore be better in arranging for the growth of the institution to build an epileptic colony to accommodate about 120 patients, and so constructed that additional quarters could be added as this class of the population increases. Thus the quarters which are now used for epileptics, and which are not well adapted for such purposes, could be utilized for the general population.

"*Additional land.*—In regard to the general solutions offered above for the expansion of the hospital it becomes necessary again to refer, as I have in previous reports, to the question of the need for additional land. This need, perhaps, is best shown as a result of a crop survey recently made by the Agricultural Department. The principal idea of this crop survey was to get data which will enable us to utilize our land to better advantage in the raising of roughage for the cows. The hospital maintains a herd of approximately 200 cows from which it derives its supply of milk. Aside from the fact that milk can be procured in this way economically, the character of milk which the hospital requires can not be bought in the quantities needed for any price in this district. It therefore becomes essential for the hospital to maintain its own dairy herd, and of course it is economical to raise as far as possible the forage for that herd. Inasmuch as we were not able to raise sufficient feed, we asked the assistance of the Agricultural Department. In summing up their report they make the following significant statement:

"It will be seen that a total of 442 acres is needed for crops. Counting 200 acres of tillable land at Godding Croft and 150 acres at the home place, there is still a deficiency of nearly 100 acres.

"This report was made when there was in view only an increase of the forage for stock without reference to the use of land for truck gardening or for other purposes. It will thus be seen that at the present time the hospital has not sufficient land on which to raise the necessary feed for its dairy herd.

"As the hospital has been growing for the past fifty years, practically every addition in the way of building construction has been made upon land that was previously used for farming purposes, and it has now been many years since any additional land was purchased. At the present time, therefore, we not only need more land for the immediate purposes set forth above, but no scheme to provide for future growth of the hospital can be considered until more land is purchased. If we are to have additional land at all, and it seems incredible that more land should not be provided, the time to provide it is now, before the laying out of additional buildings becomes necessary, so that when these building propositions come to be considered they may have the benefit of the better locations that additional land will largely afford. For example, the portion of the grounds now set aside for the female population is practically fully occupied. The natural direction for the expansion of this population is south. The hospital does not own any further land in this direction upon which buildings could be erected. It is therefore immediately desirable that this adjoining property should be purchased.

"It is economically desirable if land is going to be purchased, and I think I have shown that it must be purchased if the hospital is to be efficiently maintained, that it should be purchased now. The acquiring of additional land has been recommended time after time, not only by myself, but by preceding superintendents, but up to the present time nothing has been done. Things, however, have now reached such a pass that it would seem suicidal to put off action longer. In this connection it must be remembered that the price of land adjoining the institution is gradually but constantly advancing, and at a conservative estimate it has doubled since the need for additional land was first appreciated. These prices will continue to advance,

for the land immediately adjoining the hospital is being rapidly settled and built upon. I am still of the opinion that the way this matter should be handled is in accordance with the recommendations which are set forth in my last annual report in the following words:

"Every effort on the part of the hospital to buy land has been futile, owing to the complications that have arisen. Prices have been asked for property which were prohibitive, and all efforts to buy have been blocked by competing owners. While all this has been going on the price of land in the immediate neighborhood has been steadily increasing, so that land that could have been bought very cheaply only a few years ago could not be purchased now for five times the amount it was then offered for. The only way which I can see will relieve this situation is to introduce a bill providing for a detailed hearing on the subject before a congressional committee. The hospital's needs will then be clearly demonstrated, and results could not then be influenced by the selfish interests of property owners. The committee that investigated the hospital at the last session of Congress recognized the needs of the institution in this respect and reported 'it would be advantageous to the hospital and beneficial to the patients if additional lands could be obtained.'"

STATISTICAL TABLES.

There have been added to the list of statistical tables a table on the causes of mental disease in patients admitted during the fiscal year and a table on the duration of residence in the hospital of those discharged recovered during the fiscal year.

Admissions and discharges.

REMAINING JUNE 30, 1908.

	Male.			Female.			Total.
	White.	Colored.	Total.	White.	Colored.	Total.	
Army	850	39	889				889
Navy	188	13	201				201
Public Health and Marine-Hospital Service	28	10	38				38
Civil life	601	269	870	480	255	735	1,605
Total	1,667	331	1,998	480	255	735	2,733

ADMITTED DURING THE YEAR.

Army	173	14	187				187
Navy	87	10	97				97
Public Health and Marine-Hospital Service	6		6				6
Civil life	145	82	227	120	54	174	401
Total	411	106	517	120	54	174	691

DISCHARGED DURING THE YEAR—RECOVERED.

Army	44	3	47				47
Navy	34	4	38				38
Public Health and Marine-Hospital Service	1		1				1
Civil life	24	16	40	41	16	57	97
Total	103	23	126	41	16	57	183

Admissions and discharges—Continued.

DISCHARGED DURING THE YEAR—IMPROVED.

	Male.			Female.			Total.
	White.	Colored.	Total.	White.	Colored.	Total.	
Army	14		14				14
Navy	6		6				6
Public Health and Marine-Hospital Service							
Civil life	26	6	32	23	7	30	62
Total	46	6	52	23	7	30	82

DISCHARGED DURING THE YEAR—UNIMPROVED.

Army	6		6				6
Navy							
Public Health and Marine-Hospital Service							
Civil life	25	4	29	5	2	7	36
Total	31	4	35	5	2	7	42

DISCHARGED DURING THE YEAR—NOT INSANE.

Army	2		2				2
Navy	3		3				3
Public Health and Marine-Hospital Service							
Civil life	1	1	2	3			5
Total	6	1	7	3			10

DECEASED DURING THE YEAR.

Army	103	6	109				109
Navy	10		10				10
Public Health and Marine-Hospital Service	3	1	4				4
Civil life	46	16	62	42	28	70	132
Total	162	23	185	42	28	70	255

REMAINING JUNE 30, 1909.

Army	850	48	898				898
Navy	222	19	241				241
Public Health and Marine-Hospital Service	30	9	39				39
Civil life	628	304	932	486	256	742	1,674
Total	1,730	380	2,110	486	256	742	2,852

SUMMARY.

Remaining June 30, 1908	1,669	329	1,998	480	255	735	2,733
Admitted during the year	411	106	517	120	54	174	691
Total number under treatment	2,080	435	2,515	600	309	909	3,424
Discharged	105	21	126	41	16	57	183
Improved	46	6	52	23	7	30	82
Unimproved	31	4	35	5	2	7	42
Not insane	6	1	7	3		3	10
Died	162	23	185	42	28	70	255
Total	350	55	405	114	53	167	572
Remaining June 30, 1909	1,730	380	2,110	486	256	742	2,852

Admissions and discharges, classified according to sex, for the year ending June 30, 1909, and since the opening of the hospital in 1855.

	Year ending June 30, 1909.			Since opening of the hospital.		
	Male.	Female.	Total.	Male.	Female.	Total.
Admitted	517	174	691	14,005	3,983	17,988
Discharged:						
Recovered	133	60	193	4,762	1,024	5,786
Improved	52	30	82	2,135	798	2,933
Unimproved	35	7	42	416	176	592
Died	185	70	255	4,582	1,243	5,825
Remaining	2,110	742	2,852	2,110	742	2,852
Total number of admissions				14,005	3,983	17,988

Percentage of total admissions recovered, improved, etc.

	Male.	Female.	Total.
Recovered	34.00	25.72	32.16
Improved	15.24	20.01	16.31
Unimproved	2.97	4.42	3.28
Died	32.72	31.22	32.40
Remaining	15.07	18.63	15.85
Total	100.00	100.00	100.00

Monthly changes of population.

	Admitted.			Discharged.			Died.			Total died and discharged.
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	
1908.										
July	50	14	64	22	16	38	18	4	22	60
August	62	14	76	22	5	27	15	3	18	45
September	38	12	50	11	5	16	10	7	17	33
October	35	15	50	23	11	34	17	5	22	56
November	34	10	44	19	6	25	20	6	26	51
December	49	14	63	20	11	31	15	4	19	50
1909.										
January	55	11	66	17	6	23	9	5	14	37
February	25	14	39	9	5	14	10	6	16	30
March	26	14	40	18	9	27	19	10	29	56
April	31	16	47	25	7	32	22	7	29	61
May	34	18	52	20	10	30	14	7	21	51
June	78	22	100	14	6	20	16	6	22	42
Total	517	174	691	220	97	317	185	70	255	572

Admissions, discharges, and deaths, with the mean annual mortality and proportion of recoveries, per cent of the discharges, including deaths, for each year since the opening of the hospital.

Year.	Admitted.			Discharged.											Remaining June 30 in each year.			Daily average.			Percentage of recoveries on discharges.			Percentage of deaths on average numbers.			Percentage of deaths on total number.		
				Recovered.			Improved.			Unimproved.			Died.																
	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
1855	26	37	63	....	3	3	....	....	....	....	....	....	....	....	....	26	34	60	19.35	20.65	40.00	....	100.00	100.00	....	....	....	....	....	....
1855–56	36	11	47	3	2	5	....	....	....	....	1	1	5	3	8	54	39	93	41.20	37.98	70.18	37.50	33.33	35.71	12.13	7.09	10.10	8.06	6.66	7.48
1856–57	25	27	52	2	4	6	3	1	4	7	3	10	8	8	16	59	50	109	54.55	42.80	97.35	10.00	25.00	16.66	14.66	18.69	16.43	10.13	12.12	11.03
1857–58	29	14	43	13	5	18	1	1	2	2	....	2	7	6	13	65	52	117	57.70	50.31	108.01	56.52	44.66	51.42	12.13	11.92	12.03	7.95	9.37	8.55
1858–59	47	18	65	16	5	21	1	4	5	5	3	8	6	4	10	84	54	138	72.93	56.24	129.17	57.13	31.25	47.73	8.22	7.11	7.74	5.36	5.71	5.49
1859–60	68	24	92	26	7	33	4	3	7	3	2	5	13	5	18	106	61	167	100.68	59.00	159.68	56.52	41.17	52.38	12.91	8.47	11.27	8.55	6.41	7.25
1860–61	64	31	95	42	11	53	5	2	7	2	....	2	12	7	19	109	72	181	109.72	64.81	174.57	68.85	55.55	65.43	10.93	10.80	10.88	7.06	7.61	7.82
1861–62	174	12	186	96	8	104	14	1	15	....	....	....	26	10	36	147	65	212	123.75	65.74	189.49	70.59	42.10	67.09	21.01	15.21	19.00	9.18	11.90	9.81
1862–63	330	25	355	197	6	203	17	1	18	3	3	6	57	4	61	203	76	279	168.41	72.31	240.72	71.89	42.85	70.45	33.84	5.53	25.34	11.95	4.44	10.76
1863–64	484	25	509	282	6	288	69	1	70	5	....	5	67	8	75	364	86	350	205.73	77.66	283.39	66.66	40.00	65.75	42.56	10.30	26.40	11.75	7.92	9.51
1864–65	478	36	514	315	9	324	110	12	122	11	....	11	139	8	147	167	93	200	277.42	33.81	311.23	54.78	31.03	53.64	50.10	9.54	40.69	18.73	6.55	17.01
1865–66	194	28	222	104	5	109	20	7	27	10	1	11	41	12	53	186	96	282	190.92	90.70	281.62	59.42	20.00	54.50	21.47	13.23	18.82	11.35	9.91	10.99
1866–67	88	21	109	45	7	52	11	3	14	11	1	12	19	14	33	188	92	280	189.06	89.46	279.12	52.32	28.00	46.85	10.02	15.65	11.82	6.93	11.96	8.44
1867–68	120	33	153	49	15	64	6	2	8	5	1	6	22	5	27	226	102	328	221.17	96.44	317.61	59.75	65.22	60.95	9.95	5.18	9.50	7.14	4.00	6.23
1868–69	133	35	168	59	11	70	9	6	15	8	2	10	24	9	33	259	109	368	244.55	108.03	352.58	59.00	39.28	54.69	9.81	8.33	9.35	6.70	6.57	6.65
1869–70	146	36	182	32	8	40	16	8	24	11	3	14	15	3	18	331	123	454	294.69	108.08	402.77	43.24	36.37	41.67	5.09	2.77	4.36	3.71	2.05	3.27
1870–71	161	34	195	50	12	62	21	7	28	4	3	7	33	11	44	384	124	508	354.34	121.66	476.00	46.30	36.36	43.97	9.31	9.04	9.24	6.70	7.00	6.78
1871–72	142	44	186	43	8	51	16	13	29	8	1	9	37	7	44	422	139	561	407.21	131.57	538.78	41.34	27.59	38.34	9.09	5.32	8.16	7.04	4.17	6.34
1872–73	153	51	204	49	15	64	23	5	28	3	5	8	32	13	45	468	152	626	431.03	144.11	575.14	45.40	39.47	44.13	7.42	9.02	7.82	5.56	6.84	5.88
1873–74	192	38	230	67	12	79	22	8	30	6	3	9	39	11	50	526	156	682	492.44	151.36	643.80	50.00	35.29	47.02	7.92	7.27	7.76	5.91	5.79	5.88
1874–75	179	51	230	66	9	75	28	22	50	8	3	11	51	7	58	552	166	718	536.46	164.17	700.63	42.13	21.95	38.66	9.50	4.26	8.27	7.23	3.38	6.36
1875–76	166	47	213	67	17	84	26	10	36	1	....	1	48	18	66	570	168	744	564.78	165.59	730.37	47.18	37.78	45.45	8.49	10.87	9.04	6.68	8.45	7.09
1876–77	147	51	198	66	17	83	27	13	40	2	....	2	45	7	52	583	182	765	587.41	176.30	763.71	47.80	45.94	46.89	7.66	3.96	6.80	6.22	3.19	5.52
1877–78	138	44	182	49	11	60	32	9	41	3	4	7	37	9	46	600	193	793	596.82	184.37	781.19	40.49	33.33	38.96	6.19	4.88	5.88	5.13	5.98	4.35
1878–79	169	53	222	68	24	92	30	7	37	3	1	4	51	12	63	617	202	819	619.10	196.70	815.80	44.73	54.54	46.93	8.23	6.10	7.72	6.63	4.87	6.20
1879–80	181	44	225	38	14	52	23	10	33	....	3	3	46	13	59	691	206	897	655.34	196.63	851.97	35.51	35.00	35.37	7.01	6.61	6.92	5.76	5.28	5.65
1880–81	161	62	223	62	10	72	27	9	36	....	6	6	63	18	81	700	225	925	685.37	111.38	896.75	40.78	23.25	36.92	9.19	8.51	9.03	7.39	6.71	7.23
1881–82	178	69	247	62	21	83	31	8	39	2	5	7	74	27	101	709	233	942	697.10	232.88	929.98	36.69	34.43	36.08	10.61	11.59	10.86	8.44	9.18	8.61
1882–83	201	64	265	76	19	95	33	16	49	....	6	6	46	17	63	755	239	994	729.89	235.27	965.16	49.05	31.03	44.13	6.30	7.22	6.52	5.05	5.72	5.22
1883–84	286	64	347	68	13	81	35	8	43	3	1	4	51	16	67	884	262	1,146	797.21	243.27	1,040.48	42.03	34.21	40.51	6.39	6.57	6.44	4.90	5.33	4.99
1884–85	229	91	320	65	24	89	37	12	49	1	1	2	84	21	105	926	295	1,221	902.41	270.89	1,173.34	34.76	41.37	36.32	9.31	7.75	8.94	7.55	5.95	7.19
1885–86	234	69	303	55	22	77	58	15	73	2	3	5	79	23	102	966	301	1,267	936.39	283.23	1,219.62	28.35	34.92	29.96	8.54	8.12	8.36	6.81	6.32	6.69
1886–87	206	62	268	57	15	72	49	17	66	2	1	3	73	19	92	991	311	1,302	956.07	297.36	1,253.43	31.49	28.48	30.90	7.63	6.38	7.34	6.22	5.23	5.99
1887–88	247	71	318	59	10	69	52	14	66	3	1	4	95	25	120	1,029	332	1,361	1,009.55	315.55	1,325.08	28.23	20.00	26.64	9.41	7.92	9.06	7.67	5.64	7.41
1888–89	213	67	380	50	20	70	27	27	54	5	2	6	86	28	114	1,075	322	1,397	1,049.99	323.83	1,373.82	29.94	25.97	28.69	8.19	8.65	8.30	6.92	7.02	6.94
1889–90	274	71	345	39	6	45	43	6	49	....	3	3	112	28	144	1,115	350	1,055	1,108.57	326.53	1,435.10	20.10	13.95	18.12	10.13	9.59	9.76	8.30	7.48	8.04

1890–91	271	81	352	36	30	66	38	15	53	1	1	2	98	30	128	1,253	355	1,608	1,160.62	344.44	1,505.06	20.81	34.47	26.51	8.44	8.71	8.51	6.87	6.96	6.89
1891–92	233	70	303	56	12	68	69	13	82	8	3	11	121	32	153	1,232	365	1,597	1,226.64	348.65	1,575.29	22.05	20.00	21.66	9.86	9.18	9.71	8.14	7.53	8.01
1892–93	261	84	345	57	10	67	46	23	69	4	1	5	140	41	181	1,246	374	1,620	1,255.50	357.02	1,582.58	23.08	13.33	20.81	11.41	11.48	11.44	9.38	9.13	9.32
1893–94	273	88	361	49	13	62	49	16	65	6	....	6	138	29	167	1,277	404	1,681	1,248.16	369.91	1,618.07	20.24	22.41	20.66	11.31	7.84	10.32	9.08	6.27	8.42
1894–95	293	78	371	68	30	98	40	32	72	1	....	1	143	36	179	1,318	384	1,702	1,280.91	386.16	1,667.07	26.98	30.61	28.00	11.16	9.32	10.73	9.10	7.46	8.72
1895–96	278	92	370	74	15	89	39	14	53	7	1	8	146	41	187	1,330	405	1,735	1,290.08	379.25	1,669.33	27.81	21.12	26.40	11.31	10.81	11.20	9.14	8.61	9.02
1896–97	288	88	377	67	17	84	50	44	94	5	....	5	130	32	162	1,367	400	1,767	1,326.08	383.82	1,709.90	26.58	18.27	24.34	9.80	8.33	9.47	8.02	6.49	7.67
1897–98	347	90	437	84	12	96	30	19	49	8	1	9	167	30	197	1,425	428	1,853	1,388.25	409.75	1,798.00	29.06	19.35	27.35	12.03	7.32	10.96	9.74	6.12	8.94
1898–99	498	105	603	173	16	189	59	29	88	38	10	48	158	35	193	1,495	443	1,938	1,438.33	433.51	1,871.84	40.42	17.77	36.48	10.98	8.07	10.31	8.21	6.56	7.85
1899–1900	434	117	551	118	33	151	52	13	65	8	5	13	152	32	184	1,599	477	2,076	1,504.00	444.54	1,948.54	35.75	39.75	36.56	10.10	7.19	9.44	7.87	5.71	7.39
1900–1901	519	136	655	202	33	235	52	25	77	11	6	17	193	33	226	1,660	516	2,176	1,583.33	483.33	2,066.66	44.10	34.02	42.34	12.19	6.83	10.93	9.11	5.38	8.27
1901–2	532	154	686	209	39	248	78	20	98	9	11	20	137	40	177	1,759	557	2,316	1,675.85	518.16	2,194.01	48.26	34.51	45.42	8.17	7.70	8.06	6.24	5.97	6.18
1902–3	554	180	734	211	50	261	106	25	131	19	6	25	189	69	258	1,782	587	2,369	1,737.58	553.58	2,291.16	39.73	33.33	38.32	10.88	12.47	11.26	8.17	9.36	8.45
1903–4	584	182	766	194	42	236	95	35	130	21	13	34	189	54	245	1,847	625	2,492	1,783.08	577.00	2,360.08	38.87	29.16	36.70	10.60	8.66	10.29	7.98	6.50	7.75
1904–5	493	174	667	151	53	204	101	42	143	12	9	21	181	55	236	1,912	639	2,551	1,848.50	598.00	2,446.50	33.70	33.12	33.55	9.79	9.19	9.04	7.66	6.88	7.47
1905–6	421	180	601	173	60	233	94	33	127	29	13	42	150	52	202	1,887	661	2,548	1,887.50	654.50	2,542.00	38.34	37.34	38.07	7.94	7.95	7.94	6.42	6.34	6.40
1906–7	437	182	619	136	45	181	82	52	134	28	12	40	165	51	216	1,913	683	2,596	1,898.10	671.83	2,569.93	32.60	27.50	31.17	8.69	7.66	8.40	7.09	6.05	6.82
1907–8	472	171	643	123	39	162	80	30	110	28	5	33	156	45	201	1,998	735	2,733	1,965.70	699.00	2,664.70	31.52	32.77	32.40	7.93	6.43	7.54	6.54	5.27	6.20
1908–9	517	174	691	133	60	193	52	30	82	35	7	42	185	70	255	2,110	742	2,852	2,061.00	740.66	2,801.66	31.11	34.13	31.99	8.97	9.46	9.10	7.35	7.70	7.44

Ten "not insane," 7 males and 3 females, are included with recovered in 1908–9.

Nativity of patients admitted during the year and since the opening of the hospital in 1855.

	During year.	Since 1855.
Native born:		
Alabama	4	59
Arkansas	1	34
Arizona		1
California	2	30
Colorado		11
Connecticut	2	120
Dakota	2	12
Delaware	2	37
District of Columbia	82	2,303
Florida		21
Georgia	1	104
Illinois	13	250
Indiana	8	226
Indian Territory	2	18
Iowa	3	53
Kansas	2	46
Kentucky	9	237
Louisiana	4	55
Maine	3	140
Maryland	39	1,352
Massachusetts	10	549
Michigan	5	118
Minnesota	1	26
Mississippi	2	60
Missouri	9	135
Montana	1	2
Nebraska	2	10
New Hampshire	3	92
New Jersey	11	174
New Mexico		4
New York	23	1,136
North Carolina	11	163
Ohio	21	604
Oklahoma	1	2
Oregon		5
Pennsylvania	43	941
Rhode Island	3	55
South Carolina	3	61
Tennessee	8	145
Texas	4	61
Utah	1	3
Vermont	1	72
Virginia	62	1,804
West Virginia	5	78
Wisconsin	3	77
United States	144	637
Total	556	12,123
Foreign born:		
Alsace		1
Armenia	1	3
Austria	8	78
Bahama Islands		1
Bavaria		17
Belgium		8
Bermuda		1
Bohemia	1	8
Brazil		1
British Columbia		1
British East Indies	1	7
British possessions	1	2
British West Indies	1	13
Buenos Ayres		3
Canada	2	147
Cape Verde Islands		1
Chile		1
China	2	2
Coast of Africa	1	3
Costa Rica		1
Cuba		7
Cyprus		1
Denmark	2	48
England	8	385
Finland	1	9
France	2	101
Germany	29	1,614
Greece	1	8
Holland	2	19
Hungary	6	22
Iceland		1
Ireland	29	2,282
Italy	5	77
Japan	2	9
Korea		1
Malta		3
Mexico		14
New Brunswick		4
Newfoundland		3
New Grenada		1
Norway	5	63
Nova Scotia		23
Panama		1
Philippine Islands	1	2
Poland	3	32
Portugal		8
Prince Edward Island		3
Prussia	1	34
Roumania	2	5
Russia	7	76
Sandwich Islands		3
Saxony		6
Scotland	3	106
Sicily		3
Spain		8
Sweden	3	105
Switzerland	2	72
Turkey	1	7
Wales		22
West Indies	1	5
Unknown	1	373
Total	135	5,865
Grand total	691	17,988

Ages of patients admitted during the year ended June 30, 1909.

	Male.	Female.	Total.
10 to 15 years	4	2	6
15 to 20 years	12	11	23
20 to 25 years	116	18	134
25 to 30 years	95	22	117
30 to 35 years	69	21	90
35 to 40 years	55	22	77
40 to 45 years	38	12	50
45 to 50 years	27	14	41
50 to 60 years	35	20	55
60 to 70 years	43	21	64
70 to 80 years	22	9	31
80 to 90 years		1	1
Unascertained	1	1	2
Total	517	174	691

Civil condition of patients admitted during the year ended June 30, 1909.

	Male.	Female.	Total.
Single	333	63	396
Married	125	73	198
Widowed	42	33	75
Divorced	7	1	8
Unascertained	10	4	14
Total	517	174	691

Duration of mental disease of patients who died during the year ended June 30, 1909.

	Male.	Female.	Total.		Male.	Female.	Total.
Under 1 month	.....	3	3	4 to 6 years	20	10	30
1 to 2 months	2	4	6	6 to 10 years	21	7	28
2 to 4 months	3	1	4	10 to 15 years	19	4	23
4 to 6 months	5	3	8	15 to 20 years	5	2	7
6 to 9 months	10	2	12	20 to 25 years	7	2	9
9 months to 1 year	14	3	17	Over 25 years	14	4	18
1 year to 18 months	16	4	20	Unascertained	3	3	6
18 months to 2 years	20	5	25				
2 to 3 years	16	6	22	Total	185	70	255
3 to 4 years	10	7	17				

Ages of patients who died during the year ended June 30, 1909.

	Male.	Female.	Total.		Male.	Female.	Total.
10 to 15 years	.....	1	1	50 to 60 years	22	13	35
20 to 25 years	4	3	7	60 to 70 years	61	9	70
25 to 30 years	10	5	15	70 to 80 years	45	8	53
30 to 35 years	9	6	15	80 to 90 years	10	4	14
35 to 40 years	8	7	15	Over 90 years	.....	1	1
40 to 45 years	6	5	11				
45 to 50 years	10	8	18	Total	185	70	255

Ages of patients discharged recovered during the year ended June 30, 1909.

	Male.	Female.	Total.		Male.	Female.	Total.
10 to 20 years	8	4	12	50 to 60 years	4	4	8
20 to 30 years	72	15	87	60 to 70 years	4	1	5
30 to 40 years	26	17	43				
40 to 50 years	12	16	28	Total	126	57	183

Duration of residence in hospital of those recovered during the year ended June 30, 1909.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
10 to 20 days	3	4	6	2	15
20 to 30 days	3	2	3	.....	8
1 to 2 months	15	2	7	3	27
2 to 3 months	14	3	4	2	23
3 to 4 months	16	2	1	.....	19
4 to 6 months	22	1	8	2	33
6 to 9 months	13	2	3	2	20
9 months to 1 year	10	2	4	3	19
1 to 2 years	8	2	2	1	13
2 to 4 years	1	1	3	.....	5
Over 10 years	.....	.....	.....	1	1
Total	105	21	41	16	183

Forms of mental disease of patients admitted during the year ended June 30, 1909.

Disease.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Infection—Exhaustion psychoses:					
Acute confusional type	6	1	1	.....	8
Septic delirium	.....	.....	1	.....	1
Other types	6	2	4	5	17
Toxic psychoses—Exogenous:					
Alcoholic (other than Korsakow's psychosis)	35	14	4	1	54
Chloroform	1	0	0	0	1
Bromides	1	0	1	0	2
Opium	1	0	0	0	1
Morphine and cocaine	1	0	0	0	1
Cocaine and alcohol	2	0	1	0	3
Paranoia and paranoid states not otherwise classified	22	2	13	1	38
Manic-depressive psychosis	34	3	22	13	72
Dementia præcox	157	38	27	15	237
Paresis	31	10	5	4	50
Excitement, unclassified	7	2	6	0	15
Dementia, unclassified	7	1	2	1	11
Simple depression	2	0	3	0	5
Symptomatic depression	2	1	1	0	4
Hallucinosis, unclassified	2	0	0	0	2
Psychoses associated with other diseases:					
Psycho-neuroses—					
Epilepsy	4	7	2	3	16
Hysteria	5	1	3	0	9
Neurasthenia	2	0	1	0	3
Psychasthenia	2	0	2	0	4
Other nervous diseases—					
Polyneuritis (including Korsakow's psychosis)	5	0	1	0	6
Organic disease and injury to the brain—					
Arteriosclerosis	23	7	5	2	37
Syphilis	3	1	1	0	5
Traumatism	1	0	0	0	1
Diseases other than nervous—					
Myxœdema	0	0	1	0	1
Psychosis associated with visceral disease	3	0	0	0	3
Involutional melancholia	5	1	3	0	9
Senile dementia	30	9	5	7	51
Constitutional inferiority	5	0	0	0	5
Imbecility	1	5	1	1	8
Not insane	5	1	4	1	11
Total	411	106	120	54	691

Forms of mental disease in patients discharged as recovered during the year ended June 30, 1909.

Disease.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Infection—Exhaustion psychoses:					
Acute confusional type	7	.....	1	4	12
Other types	4	.....	4	3	11
Toxic psychoses—Exogenous:					
Alcoholic psychoses—					
Delirium tremens	4	4	1	.....	9
Atypical delirium tremens	3	1	.....	.....	4
Acute hallucinosis	9	.....	.....	.....	9
Acute psychoses, unclassified	5	2	2	.....	9
Pathological drunkenness	4	1	.....	.....	5
Chronic delirium	1	.....	.....	.....	1
Chronic alcoholism	1	.....	1	.....	2
Other exogenous toxines—					
Bromides	1	.....	1	.....	2
Chloroform	1	.....	.....	.....	1
Morphine	.....	.....	1	.....	1
Morphine and alcohol	1	.....	.....	.....	1
Morphine and cocaine	1	.....	1	.....	2
Cocaine and alcohol	1	.....	1	.....	2
Paranoid states of varied etiologies	6	.....	.....	.....	6
Manic depressive psychoses	17	2	19	4	42

Forms of mental disease in patients discharged as recovered during the year ended June 30, 1909—Continued.

Disease.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Dementia praecox:					
Hebephrenic form	7	1	.....	2	10
Catatonic form	8	2	1	.....	11
Paranoid form	1	.....	.....	.....	1
Unclassified	3	1	1	.....	5
Excitement, unclassified	3	4	2	3	12
Depression, symtomatic	1	1	.....	.....	2
Depression, unclassified	7	1	1	.....	9
Depressive hallucinosis	1	.....	.....	.....	1
Hallucinosis, unilateral	1	.....	.....	.....	1
Periodical psychosis, unclassified	.....	.....	1	.....	1
Psychoses associated with other diseases:					
Psycho-neuroses—					
Epilepsy	1	.....	.....	.....	1
Hysteria	3	.....	2	.....	5
Neurasthenia	2	.....	.....	.....	2
Other nervous diseases—					
Exopthalmic goitre	.....	.....	1	.....	1
Organic disease and injury to brain—					
Traumatism	1	1	.....	.....	2
Total	105	21	41	16	183

Causes of mental disease in patients admitted during the year ended June 30, 1909.

Causes.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Mental:					
Mental stress, worry, and overwork	11	2	14	1	28
Love affairs	.....	.....	1	1	2
Emotional shock	2	.....	2	.....	4
Physical:					
Syphilis	25	11	5	4	45
Syphilis and trauma	1	.....	.....	.....	1
Chronic alcoholic intoxication	35	14	4	1	54
Alcohol intoxication combined with drugs	3	.....	2	.....	5
Alcoholic intoxication and senectus	3	.....	.....	.....	3
Alcoholic intoxication with visceral and general diseases	3	.....	.....	1	4
Alcoholic intoxication and trauma	.....	2	1	.....	3
Drug intoxication	3	.....	2	.....	5
Visceral and general diseases	7	2	4	5	18
Incident to pregnancy and parturition	.....	.....	5	.....	5
Head trauma	1	2	1	.....	4
Epilepsy	4	7	2	3	16
Arteriosclerosis	23	7	5	2	37
Senectus	20	9	6	6	41
Myxoedema	.....	.....	1	.....	1
Heredity (combined with other causes)	37	3	23	3	66
Psychopathic constitution	8	4	2	.....	14
Neuropathic constitution	4	.....	2	.....	6
Congenital defect	5	8	2	1	16
Indeterminate	211	34	32	25	302
Not insane	5	1	4	1	11
Total	411	106	120	54	691

Detailed statement of receipts and expenditures for the fiscal year ended June 30, 1908—additional.

RECEIPTS.

On hand:		
Support	$1,738.58	
Repairs	5,204.38	
Disallowances	129.07	
		$7,072.03

EXPENDITURES.

Furniture and bedding:		
Furniture		$460.98
Surgical supplies		20.00
Farm and garden:		
Wagons and harness	$351.16	
Horticultural supplies	238.75	
		589.91
Miscellaneous:		
Supply transportation	2.50	
Messages	5.50	
Transportation of patients	29.05	
		37.05
Books and stationery:		
Books		19.50
Repairs:		
Construction		5,112.90
Balance in United States Treasury:		
Support	$730.17	
Repairs	101.52	
		831.69
		7,072.03

Statement of receipts and expenditures for the fiscal year ended June 30, 1909.

RECEIPTS.

Appropriated for:	
Support	$305,800.00
District of Columbia patients	299,692.93
Marine Hospital patients' board	9,099.36
Repairs	35,000.00
Buildings and grounds	30,000.00
Miscellaneous receipts	27,144.68
Disallowances	236.73
On hand, buildings and grounds	130,637.25
	837,610.95

EXPENDITURES.

Provisions and stores:		
Class 1. Farinaceous food	$30,000.38	
Class 2. Yeast	674.55	
Class 3. Meats, fresh	39,086.05	
Class 4. Poultry	2,191.09	
Class 5. Meats, salt and smoked	22,865.17	
Class 6. Fish, fresh	5,340.19	
Class 7. Fish, salt	3,505.95	
Class 8. Vegetables, fresh	8,641.78	
Class 9. Vegetables, canned	2,875.43	
Class 10. Fruits, fresh	1,060.63	
Class 11. Fruits, dried	4,465.52	
Class 12. Preserves and jellies		
Class 13. Dairy products	25,238.67	
Class 14. Groceries, wet	4,810.89	
Class 15. Groceries, dry	28,835.80	
Class 16. Condiments	220.98	
Class 17. Laundry supplies	6,467.71	
Class 18. Crockery and china	1,639.78	
Class 19. Tin and iron ware	477.68	
Class 20. Cutlery and plated ware	113.76	
Class 21. Household supplies	3,107.98	
Class 22. Wooden ware		
Class 23. Toilet articles	965.53	
Class 24. Fuel	60,004.57	
		252,590.09
Furniture and bedding:		
Class 25. Furniture	3,102.57	
Class 26. Bedding	7,428.39	

Furniture and bedding—Continued.		
Class 27. Window furniture	$503.47	
Class 28. Table linen	1,393.46	
Class 29. Upholstery and furniture material	8.75	
Class 30. Sewing-machine supplies	4.10	
Class 31. Carpets, etc	413.00	
		$12,853.74
Dry goods and clothing:		
Class 32. Clothing, new	2,833.47	
Class 33. Clothing material	11,831.71	
Class 34. Hats, straw	135.23	
Class 35. Hats, felt	333.75	
Class 36. Hosiery	530.32	
Class 37. Haberdashery	384.65	
Class 38. Shoes and slippers, men's	5,030.87	
Class 39. Shoes and slippers, women's	375.57	
		21,455.57
Medical supplies:		
Class 40. Medical supplies	4,191.62	
Class 41. Surgical supplies	1,244.32	
Class 42. Laboratory supplies	789.85	
		6,225.79
Farm and garden:		
Class 43. Wagons and harness	2,331.64	
Class 44. Farm and garden implements	606.80	
Class 45. Lawns, roads, and grounds	589.32	
Class 46. Farm supplies	952.27	
Class 47. Horticultural supplies	451.17	
Class 48. Stable maintenance	919.38	
Class 49. Live stock	3,707.00	
Class 50. Farm feed	6,593.40	
Class 51. Dairy feed	13,001.21	
Class 52. Poultry feed	732.76	
		29,884.95
Miscellaneous:		
Class 53. Entertainment of patients	1,170.30	
Class 54. Traveling expenses		
Class 55. Supply transportation	19.41	
Class 56. Return of escaped patients	370.00	
Class 57. Messages	1,019.09	
Class 58. Advertisements	2.46	
Class 59. Miscellaneous	1,613.13	
Class 60. Transportation of patients	279.27	
		4,473.66
Books and stationery:		
Class 61. Stationery supplies	740.71	
Class 62. Printing	30.29	
Class 63. Books	247.51	
Class 64. Periodicals	327.90	
		1,346.41
Construction:		
Class 65. Engineers' supplies	10,769.80	
Class 66. Electrical supplies	2,018.04	
Class 67. Carpenters' supplies	3,418.31	
Class 68. Tinners' supplies	343.46	
Class 69. Painters' supplies	1,866.79	
		18,416.40
Repairs:		
Class 70. Pay roll	16,637.41	
Class 71. Engineers' supplies	2,610.54	
Class 72. Carpenters' and builders' supplies	8,495.77	
Class 73. Tinners' supplies		
Class 74. Painters' supplies	213.99	
Class 75. Construction	7,017.60	
		34,975.31
Buildings and grounds:		
Class 76. Pay roll, roadways, grading and walks	2,753.20	
Class 77. Roadways, grading and walks	4,288.62	
Class 78. Furniture for new buildings	2,464.81	
Class 79. Assembly hall	88,863.65	
Class 80. Pay roll, change of railway switch	69.53	

Buildings and grounds—Continued.		
Class 81. Pay roll, assembly hall	$1,125.00	
Class 100. Pay roll, trenching, drainage, etc	620.88	
Class 101. Trenching, drainage, etc	56.60	
Class 102. Pay roll, furniture for new buildings	21.00	
Class 103. Pay roll, coal trestle	60.75	
Class 104. Coal trestle, etc	14.69	
Class 105. Painting new buildings	351.62	
Class 106. Pay roll, painting new buildings	287.48	
Class 107. Furniture for assembly hall	236.91	
		$101,214.74
Pay roll:		
Class 82. Officers	29,590.72	
Class 83. Administrative	24,456.87	
Class 84. Ward service	107,987.48	
Class 85. Domestic service	6,480.59	
Class 86. Kitchen service	23,842.16	
Class 87. Industrial	5,604.33	
Class 88. Laundry	11,550.87	
Class 89. Fire	600.00	
Class 90. Engineers	32,438.83	
Class 91. Carpenters and builders	5,905.75	
Class 92. Tinners	630.00	
Class 93. Construction	1,929.33	
Class 94. Painters	3,494.69	
Class 95. Electricians	5,887.50	
Class 96. Farm and garden	16,697.08	
Class 97. Stable	6,403.25	
Class 98. Dairy and cow barns	4,196.91	
Class 99. Lawns and grounds	3,782.27	
		291,478.63
On hand:		
Support	3,247.28	
Repairs	24.87	
Buildings and grounds	26,087.95	
Covered into United States Treasury to close appropriation lapsed into surplus fund, act of Congress:		
Approved March 4, 1909	4.14	
Buildings and grounds	29,620.80	
Extension of hospital	3,710.62	
		62,695.66
Total		837,610.95

The following summaries of population and expenditures have been prepared in accordance with a resolution of the National Conference of Charities and Corrections adopted May 15, 1906:

Summary of population.

	Male.	Female.	Total.
Number of patients at beginning of fiscal year	1,998	735	2,733
Number of patients received during the year	517	174	691
Number of patients discharged or died during the year	405	167	572
Number of patients at end of fiscal year	2,110	742	2,852
Daily average number of patients	2,061	740	2,801
Average number of officers and employees during the year	486	264	750

Summary of expenditures.

Current expenditures:	
Salaries and wages	$288,695.73
Clothing	23,665.29
Subsistence	288,249.71
Ordinary repairs	34,975.31
Office, domestic and other expenses	40,884.02
Extraordinary expenses:	
New buildings, lands, etc	92,138.24
Permanent improvements to existing buildings	3,950.76
Total	772,559.06

REPORT OF THE COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

OFFICERS OF THE INSTITUTION.

Patron.—William Howard Taft, President of the United States.
President.—Edward Miner Gallaudet, Ph. D., LL. D.
Secretary.—Charles S. Bradley, esq.
Treasurer.—George X. McLanahan, esq.
Directors.—Hon. George C. Perkins, Senator from California; Hon. Charles N. Fowler, Member of Congress from New Jersey; Hon. Thetus W. Sims, Member of Congress from Tennessee, representing the Congress of the United States; Hon. John W. Foster, Hon. David J. Brewer, Hon. Francis M. Cockrell, R. Ross Perry, esq., Theodore W. Noyes, esq., of the District of Columbia; John B. Wight, esq., of New York.

FACULTY OF GALLAUDET COLLEGE.

President and professor of moral and political science.—Edward Miner Gallaudet, Ph. D., LL. D.
Vice-president, and professor of languages.—Edward A. Fay, M. A., Ph. D.
Emeritus professor of natural science, and lecturer on pedagogy.—Rev. John W. Chickering, M. A.
Professor of history and English.—J. Burton Hotchkiss, M. A., Litt. D.
Professor of mathematics and Latin.—Amos G. Draper, M. A., Litt. D.
Professor of natural science.—Charles R. Ely, M. A., Ph. D.
Professor of applied mathematics and pedagogy.—Percival Hall, M. A.
Professor of physics and biology.—Herbert E. Day, M. A.
Assistant professor of Latin.—Allan B. Fay, M. A.
Instructor in English and Latin, and librarian.—Elizabeth Peet.
Instructor in engineering.—Isaac Allison, E. E.
Instructor in gymnastics.—Albert F. Adams, M. A.
Instructor in drawing.—Arthur D. Bryant, B. Ph.

DEPARTMENT OF ARTICULATION.

Professor in charge.—Percival Hall, M. A.
Instructor.—Annie E. Jameson.
Normal fellows.—Salva Clarinda Bradley, A. B., William Woods College, Missouri; Ignatius Thorvald Bjorlee, B. S., St. Olaf College, Minnesota; Alfred Leslie Brown, B. L., Westminster College, Missouri.
Normal student.—Florence Maude Key, Olathe High School, Kansas.

FACULTY OF THE KENDALL SCHOOL.

President.—Edward Miner Gallaudet, Ph. D., LL. D.
Emeritus principal and instructor of the normal class.—James Denison, M. A.
Principal and instructor of the high class.—Lyman Steed, M. A.
Instructors.—Melville Ballard, M. S.; Theodore A. Kiesel, B. Ph.; Sarah H. Porter, M. A.; Clara Taliaferro; Helen Fay; Musa Marbut, M. A.

DOMESTIC DEPARTMENT.

Supervisor and disbursing agent.—Wallace G. Fowler.
Attending physician.—D. Kerfoot Shute, M. D.
Matron.—Myrtle M. Ellis.
Associate matron.—Mary E. Schenck.
Boys' supervisor.—Frederick W. Schoneman, B. Ph.
Girls' supervisor.—Mattie Maud Holland.
Master of shop.—Isaac Allison, E. E.
Farmer and gardener.—Edward Mangum.

REPORT OF THE COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB,
Kendall Green, Washington, D. C., October 19, 1909.

SIR: The number of students and pupils remaining in the institution July 1, 1909, was 126; admitted during the year, 40; since admitted, 22; total, 188. Under instruction since July 1, 1908, 112 males and 76 females, of which 132 have been in the collegiate department, representing 36 States, the District of Columbia, Canada, and Scotland, and 56 in the primary department. Of these 35 were admitted as beneficiaries of the District of Columbia. During the fiscal year 27 were discharged from the institution by graduation and otherwise.

A list of the names of students and pupils who have been under instruction in this institution since July 1, 1908, will be found appended to this report.

HEALTH.

Good health has prevailed generally among the students and pupils during the year. Three cases of measles occurred, of a mild type, but our facilities for isolating them were so good that there was no spread of the disease.

The mastoid operation was successfully performed on one of our students at the George Washington University Hospital by Dr. W. K. Butler.

A second case of mastoiditis occurred a few weeks ago, which was complicated with pneumonia after the operation and resulted fatally.

The young man, Mr. Norman D. McDonald, of Michigan, was a member of the junior class of the college, and had made a highly creditable record as a student and as a man.

COURSES OF INSTRUCTION.

In the college, as was foreshadowed in our last report, an advance of one year has been made in our requirements for admission.

This will of course advance our standard of graduation one year, bringing in a larger range of studies than we have hitherto had in our college curriculum.

Details of these advances will be published and furnished to the schools for the deaf throughout the county in our next college catalogue.

This advance in our college course makes it necessary to add a year to the curriculum of our Kendall School, so that graduates of the school may be fully prepared to enter the college.

No change has been made in the course in our normal department.

LECTURES.

The following special lectures have been delivered during the year:

IN THE COLLEGE.

The True College Spirit, by President Gallaudet.
Marriage, by Professor Fay.
The Origin of Language, by Professor Hotchkiss.
The United States Steel Corporation, by Professor Draper.
Aerial Navigation, by Professor Ely.
Sir Isaac Newton, by Professor Hall.
Dr. Samuel Johnson, by Prof. A. B. Fay.
The Summer Work of a Great University, by Professor Day.
The Diplomacy of Metternich, by Professor Gaw.

IN THE KENDALL SCHOOL.

Gareth and Lynette, by Mr. Denison.
What Led to the Downfall of Napoleon, by Mr. Ballard.
Putnam in the Wolf's Den, by Mr. Bryant.
Wild West Adventures, by Mr. Schoneman.
Pied Piper of Hamelin, by Mr. Reiter.
The Man Without a Country, by Mr. Cone.
Midas—The Golden Touch, by Mr. LaCrosse.

RECEIPTS AND EXPENDITURES.

The receipts and expenditures for the year under review will appear from the following detailed statements:

Receipts and expenditures, maintenance of institution.

RECEIPTS.

Balance from old account	$775.45
From the Treasury of the United States	73,000.00
Board and tuition	4,885.00
Total	78,660.45

EXPENDITURES.

Salaries and wages	$46,993.13
Miscellaneous repairs	830.78
Household and marketing	4,466.79
Meats	4,553.84
Groceries	3,399.69
Butter and eggs	2,070.48
Bread	1,664.14
Medical attendance and nursing	1,089.66
Telephone, electric clocks, and fire alarms	442.73
Furniture	156.65
Dry goods	582.16
Gas	1,100.10
Fuel	3,615.46
Feed	2,243.67
Medicines and chemicals	274.38
Books and stationery	508.03
Hardware	274.91
Plants, seeds, and tools	624.07
Blacksmithing	263.29
Carriage repairs	275.85
Ice	334.02
Live stock	975.75
Incidental expenses	289.10

Stamped envelopes	$42.48
Auditing accounts	300.00
Printing	146.75
Lectures	65.00
Harness and repairs	238.95
Balance	838.53
Total	78,660.45

Receipts and expenditures, special repairs.

RECEIPTS.

Treasury of the United States	$5,000.00

EXPENDITURES.

Lumber	231.31
Plumbing and steam fitting	108.26
Mason work	591.85
Paper hanging	661.18
Painting and carpentry	454.00
Whitewashing	81.00
Slate roofing	201.90
Tin roofing	346.78
Greenhouse	1,666.97
Metal ceiling	401.74
Paints	174.01
Hardware and tools	81.00
Total	5,000.00

Inclosure and improvement of grounds.

RECEIPTS.

Treasury of the United States	$2,500.00

EXPENDITURES.

Supervision and carpenter work	1,200.00
Painting	80.60
Lumber and posts	399.67
Labor	528.07
Engineer commissioner	20.00
Wire and hardware for fence	271.66
Total	2,500.00

ESTIMATES FOR FISCAL YEAR ENDING JUNE 30, 1911.

The following estimates for the fiscal year ending June 30, 1911, have already been submitted:

For the support of the institution, including salaries and incidental expenses; for books and illustrative apparatus, and for general repairs and improvements, $77,000.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, $5,000.

These estimates are the same in amount as those that we submitted for the year ending June 30, 1910. It is believed that they will be sufficient to cover the necessary expenses of the institution and that with a less sum the proper expenses of the institution can not be met.

CHANGES IN CORPS OF INSTRUCTORS.

Asst. Prof. Albert C. Gaw, of our college faculty, has resigned his position, retiring at the end of our last college year. His retirement is greatly to be regretted, for he has proved himself an efficient and valuable officer of the institution.

Mrs. Anna S. Gaw, who has been for several years a successful instructor of speech and lip reading in our Kendall School, resigned her position at the close of our school year.

Our best wishes go with Professor and Mrs. Gaw for their future success in any line of work they may take up.

Mr. James Denison, who has been a teacher in our Kendall School for fifty-two years, and principal of the school for thirty-nine years, resigned his position last June.

Few teachers have made so long a record, and so creditable, in the work of instruction as Mr. Denison.

Mr. Denison will remain with us as an instructor in our normal department, and his position as principal of the Kendall School has been filled by the appointment of Mr. Lyman Steed, who has been for three years the principal of the Institution for Colored Deaf and Blind in Baltimore. Mr. Steed is a graduate of Westminster College, Missouri, and of the State Normal School. He completed the course of training in our normal department in 1906.

Miss Musa Marbut, of North Carolina, has been appointed to fill the vacancy occasioned by Mrs. Gaw's resignation. She is a graduate of our normal department and has had an experience of four years as an instructor in the schools for the deaf in Hartford, Conn., and Philadelphia, Pa.

THE EXERCISES OF PRESENTATION DAY.

The public anniversary of the college was held in the college chapel on Wednesday, May 5.

Rev. Samuel H. Woodrow, D. D., pastor of the First Congregational Church, offered the opening prayer.

The orations delivered by members of the graduating class were as follows:

Swedish Peasant Customs, Ellen Dorothy Johnson, Minnesota.
Early Kansas, Mary Edetha Williams, Kansas.
The Penalty of Humor, Frederick Joseph O'Donnell, Minnesota.
Devil's Gulch, Jessie Attaresta Beardsley, South Dakota.
The Mission of Poetry, Margaret Mary Leveck, Michigan.

PRESENTATION OF CANDIDATES FOR DEGREES.

In presenting the candidates for degrees, President Gallaudet said: "Gentlemen of the board of directors, it is now my pleasant duty to present to you as candidates for degrees these young people who have been pursuing their studies in the college for the past few years.

For the degree of bachelor of letters.

Robert Lee Davis, Texas.
Morton Howard Henry, New Jersey.
Ellen Dorothy Johnson, Minnesota.
Harold Aldred Preston, Michigan.

For the degree of bachelor of philosophy.

Frederick J. O'Donnell, Minnesota.
Walter Frank Poshusta, Iowa.

For the degree of bachelor of arts.

Jessie Attaresta Beardsley, South Dakota.
Margaret Mary Leveck, Michigan.
Sarah Belle Streby, Arkansas.
Mary Edetha Williams, Kansas.

"These young people whom I have just named have pursued regular courses in the college. We have also, as you are aware, a normal class composed of young people who have all their faculties, who are preparing themselves to be teachers of the deaf. We have a class of 5 this year. Those who are college graduates I present as candidates for the degree of master of arts. One member of the class is not a college graduate, and is presented as a normal student for a diploma of graduation.

NORMAL FELLOWS.

For the degree of master of arts.

Ernestine Faye Ball, M. A., Ohio State University, Ohio.
Orville Clark Cone, B. A., Colgate University, New York.
Edwin Louis La Crosse, B. Ph., Union College, New York.
Frank Horace Reiter, B. A., Muhlenberg College, Pennsylvania.

NORMAL STUDENT.

Florence Josephine Ensworth, Bainbridge High School, New York.

"In addition to these, who have been pursuing studies here, the faculty have authorized me to recommend to the board two graduates of the college who are teachers in schools for the deaf for the degree of master of arts in course.

For the degree of master of arts in course.

Arthur L. Roberts, Kansas, B. A., Gallaudet College, 1904.
H. Lorraine Tracy, Louisiana, B. A., Gallaudet College, 1890.

"These young men are successful teachers of the deaf in the States in which they live. They have pursued special courses of study approved by the faculty and have submitted to the faculty theses on subjects connected with their line of research.

"The board has authorized me to announce to-day that one honorary degree will be conferred: The degree of master of arts, honorary, upon Mr. Dwight F. Bangs, the superintendent of the School for the Deaf, in North Dakota, a gentleman who has been a successful educator of the deaf for a number of years, one well deserving of the honor now conferred upon him.

"We have the pleasure of the presence to-day of a friend who has won deserved distinction as one who in a not far-distant city has promoted the welfare of young men. While the pastor of a church in Philadelphia he was especially instrumental in promoting the welfare of that city through his work in the Young Men's Christian Association, giving his time and his sympathy for a number of years to this special work. I have great pleasure in presenting my friend and pastor, Dr. Charles Wood, of the Church of the Covenant."

DOCTOR WOOD'S ADDRESS.

"Mr. President and Friends: When it is stoutly asserted by scientists that the blow with which Cain struck Abel is still quivering in the air, and that the tiniest footfall of the littlest child upon this earth shakes it to its very center, the statement may not seem to us of any great scientific value, but we may at least draw the interesting conclusion that faith has its uses in other spheres besides religion. Whatever may happen to the center of the earth, it is evident to us all that the surface of the earth is molded and shaped by glaciers and floods, by earthquakes and cataclysms.

"About this earth on which we live and our part in shaping it I am to speak to you a little while this afternoon. Surely you and I have little to do in comparison with glaciers and floods, with earthquakes and volcanoes. Neither have we any such part to play as is given to men of great genius who tunnel mountains, throw giant causeways across rivers, and cut continents in two, so that mighty steamships pass easily from ocean to ocean. Our part is much humbler. Our place may be with the man with the ax, who changes the forest into a field, or with the man of the spade, who transforms the desert into a garden, or with "the man with the hoe," who succeeds in making two blades of grass grow where once there was only one, or none at all. Some of you may become farmers or farmers' wives, and if you should, you will do much in shaping the surface of the earth on which we live.

"But in speaking to the graduating class to-day, and to others of you who will soon be in graduating classes, I have specially in mind the world of humanity around us, the plastic world of hope and fear, of joy and sorrow, that after all is the world in which you and I live, the world of men and women, and that is the world we are to shape and to mold by our influence. Here thought is the great shaper, the great molder of us all. We are all potters, and the plastic clay is everywhere. But the potter is first fashioned by his own thoughts. Tennyson stood in amazement before 'That main miracle that thou art thou with power on thine own thought and on the world.'

"It is by the power of our own thought that we are to mold the world about us. First, through our conversation, whether by signs and symbols, or by writing and by speech. Often it comes to pass that those who make the most strenuous efforts to mold and shape life by addresses, lectures, sermons, teaching, are the ones who are least confident of the effect produced by their efforts.

"One of the foremost preachers of recent times once said that he preached and preached, and 'he was amazed at the effect that he did not have.' Most preachers, teachers, and lecturers have some times felt that way. It certainly is a most difficult matter to make others see things just as we do, and when we attempt it we usually go away disappointed.

"It does not often happen when two persons engage in a controversy that each is able to convince the other that his point of view is the right one. It is reported that a Roman Catholic priest took a long walk with a Protestant clergyman, and the arguments of each were so convincing that the Roman Catholic priest became a Protestant clergyman and the Protestant clergyman became a Roman Catholic priest.

"But usually it is by suggestion rather than by argument that lives are molded. As a small boy in church the text, 'For every idle word that men speak they shall give account in the day of judgment,' struck me as a little hard. But when you stop to consider it you see that it is the 'idle' or unpremeditated word that shows one's heart, and therefore is most likely to stamp its character on the listener.

"Two young men in a college town years ago were walking one night under the trees; one of them was a distinguished scholar, easily the leading man of his class, an orator and an embryo poet; the other was a commonplace man—a one-talented man. As they talked together the commonplace man stopped, and in a burst of courageous enthusiasm said to his talented friend, 'You are the most influential man in this college, and you ought to take your stand for God.' They went on their way. The commonplace man forgot all about the conversation. Fifteen years went by. Both college students had become clergymen. The brilliant scholar was preaching for his friend, and in the middle of his sermon he paused and said, 'It is due to a sentence spoken by my friend, the pastor of this church, fifteen years ago under the trees of our college town that I am in the Christian ministry to-day. By that sentence my life was shaped.' Potters are we and the imprint that we make by an unpremeditated remark may be an imprint forever on the life of a friend.

"Not only by conversation but by conduct we are molding the lives of those around us. You have only to take up a book of fashion plates to see the influence there is in one person's example upon others. Some one of importance, a king or courtier, has had a defect which it was necessary to hide, and in order to do this an exaggerated cloak, coat, dress, or hat has been worn, and very soon others who had no defect to conceal copied the new style and a fashion possibly ridiculous was formed. The slightest thing we do or say may impress somebody else entirely without any knowledge or intention on our part.

"Richter, the German poet, on one occasion was watching a flock of sheep. The bellwether jumped over a fence and immediately the other sheep followed. Richter took down the rail, but the sheep went on following the leader. Every sheep kept on jumping because the bellwether had jumped. Men and women are all like sheep. If one jumps, all jump, when there is nothing to jump over. Looking into your life, you may see that the rail has been taken down, but you keep on jumping just the same. As a companion picture, place by the side of the German who took the rail down the Englishman who put a fence up. In Surrey, in England, the great English naturalist Darwin was visiting some time after his scientific discoveries and books had made him famous. The people in that locality had long before found that for some unaccountable reason trees would not grow. The only trees in sight were a little clump. The downs everywhere were perfectly destitute of any vegetation except heather. While Mr. Darwin was on his visit his friends said: 'We have something we would like you to explain. You see there are no trees in sight except in that one clump, and nobody planted those trees. Now solve us this riddle.'

"Mr. Darwin knelt down and pushed the heather aside. In a few moments he said: 'Gentlemen, here is the explanation. The fence is the cause of the trees. See, here in the heather are vigorous sprouts

kept close cropped by the sheep.' When the fence shut out the sheep the trees grew.

"There is a great deal in building fences sometimes. There are people who will say to you: 'Do not have any fences in your lives. Never join a Christian Endeavor Society because there is a pledge in it. Keep yourselves entirely unpledged—unfenced.' But I think that those who know life best see that by means of a fence many destructive things are excluded. 'The little foxes that gnaw the vines' are kept out. And when others find that inside your fence you are raising flowers and fruit, which they have not succeeded in growing, they will say, 'Why should not we, too, build a fence?'

"Great as is the influence of speech and conduct, greater still is the influence of character. You remember that often-quoted remark of Emerson's to his friend, 'I can not hear what you say, because your life speaks so loud.' A man's life drowns out what he says unless his life and his words are in tune with each other. The silent voices of character are heard farther than the blasts of a trumpet. The man whose money has been acquired by doubtful means makes a gift of $100,000 and everybody laughs, or cries, 'It's tainted.' But the honest mechanic or the merchant, whose income is perhaps $1,500 or $2,000, makes a small gift to some charity and immediately other mechanics and other merchants say, 'That is what we ought to do.'

"It is what a man is, not what he says or does, that counts. There are people who give their assent unhesitatingly to elaborate creeds, but when you come close to them you immediately begin to lose faith in God and man and in yourself, because in the heart of them there is no real faith in goodness, truth, honor, or righteousness. There are men whose wives tremble when they come home and their children hide. Their friends freeze up as they approach. They wonder at it, as an iceberg might wonder that it finds the Gulf Stream cold.

"But there are other men who, as soon as they come near, make you believe in purity, goodness, and truth, and after you have been with them a while you go out and say, 'Oh, God, I will yet be a man.' It is by our characters that we are leaving our impress on those around us. This very wonderful school is what it is in large part because of the officers and the teachers, but the particular character of the school depends in great measure on the students themselves and on their attitude toward what is good and true and right.

"I have heard it said by officers in educational institutions, 'Last year the atmosphere of our school was not so good as it is this year. There seems to be a better spirit now.' When I have asked how they explained the difference they have said, 'This year there are some men of exceptionally strong character in the class and the whole school feels their influence.' I heard the president of a college say to a father once, and you can imagine how that father's heart thrilled, 'I should like to have your son come and spend a week with us every year.' And when the father asked why, the president said, 'Just for the influence of his personality.'

"You, too, are going to make better schools or worse schools, a better world or a worse world because you have been in it. A wasp flies over a garden, hovers around the flowers, and brings back only poison. A bee flies over the same garden, hovers around the same

flowers, and brings back nothing but honey. You do not blame the wasp; you give no special credit to the bee. But when men and women go out into the world they can choose what they will do in it and get from it. They can choose the poison or they can choose the honey. By your choices you will add to the world's bitterness or sweetness."

The exercises of the day were closed with the benediction by Rev. Roland Cotton Smith, D. D., rector of St. John's Church.

CONFERRING OF DEGREES.

On the closing day of the term, June 23, degrees were conferred, in accordance with the recommendations of presentation day, upon all the candidates who had complied with the requirements of the faculty.

Mr. Poshusta received the degree of bachelor of science.

Messrs. Davis, O'Donnell, and Preston will receive their degrees when they have completed the final examinations.

All of which is respectfully submitted by order of the board of directors.

EDWARD M. GALLAUDET,
President.

The SECRETARY OF THE INTERIOR.

CATALOGUE OF STUDENTS AND PUPILS.

IN THE COLLEGE.

Alabama:
- Walter D. Bell.
- Alton M. Bell.

Arizona:
- Ethel F. Eaton.

Arkansas:
- Ora H. Blanchard.
- James S. Bowen.
- Zeb Edmiston.
- Dean Horn.
- Mamie L. Wallace.
- A. W. Patterson.

California:
- Golda M. Fitzgerald.
- Leslie A. Elmer.

Colorado:
- Mabel J. Jensen.
- John C. Clesson.

Connecticut:
- Michael Lapides.

District of Columbia:
- Maud E. Edington.

Florida:
- Alice A. Nicholson.
- Abbie M. Goff.

Georgia:
- Henry S. Morris.

Idaho:
- Leora M. Hughes.
- Lulu M. Lewis.

Illinois:
- Goldie A. Newman.
- Iva M. Robinson.

Indiana:
- Leon P. Jones.
- R. O. Yoder.

Iowa:
- Sarah B. Streby.
- Walter F. Poshusta.
- Luverne S. Byrne.
- Hubert B. West.
- Ransom H. Arch.
- Melvin Lien.
- Ragnhilda Lee.
- Effie S. Gifford.
- Elizabeth R. Rhoades.

Kansas:
- Mary J. Gillman.
- M. Edetha Williams.
- John T. Hower.
- Homer E. Grace.
- William Schaefer.
- George E. Pinto.
- Cora A. Denton.

Kentucky:
- Adolph N. Struck.
- Rose K. Bode.

Maine:
- Leo K. Holmes.
- Patrick J. Thibodeau.

Catalogue of students and pupils—Continued.

IN THE COLLEGE—Continued.

Manitoba:
Charlotte H. Jameson.
Archibald H. MacDonald.
Archibald Wright, jr.
Maryland:
Thomas J. Blake.
Michigan:
Margaret M. Leveck.
Harold Preston.
George Burkart.
Gottlieb Bieri.
Ida M. Linabury.
Norman D. McDonald.
B. E. Maxson.
George F. Gorman.
Belle Van Ostrand.
Otto Buby.
Minnesota:
Frederick J. O'Donnell.
Ellen D. Johnson.
Philip E. Cadwell.
Mary M. Fossan.
Petra F. Fandrem.
Clarence Sharp.
Mississippi:
Shelby W. Harris.
Missouri:
Elmer Talbert.
Russell P. Handley.
Jennie F. Susman.
Mary I. Morrison.
Nebraska:
Anna V. Johnson.
Maude E. Roath.
Eugene Hogle.
R. W. Mullin.
Ruia Burt.
Harriet Bauman.
New Jersey:
Morton H. Henry.
New York:
Arthur B. Dillon.
Edwin W. Nies.
Vernon S. Birck.
Margaret G. Sherman.
Robert Paterson.
Samuel Cohen.
North Carolina:
Emma L. Pike.
George H. Bailey.
Virgie A. Haywood.
Sarah K. Herring.
O. Hunter.
Orpah Prevatt.
Charles E. Jones.
North Dakota:
Gilbert J. Isackson.
Olga Anderson.
Carl Anderson.
Oregon:
Bird L. Craven.
Harry Gardner.
Ohio:
William N. Toomey.
John H. Mueller.
William H. Arras.
Helena Froelich.
Emma J. Neumann.
Ruth Knox.
Frances Rumsey.
Pennsylvania:
Francis M. Holliday.
Philip R. Schroedel.
Emily A. S. Blackwood.
Mary H. Burns.
Hume L. Battiste.
Carl M. Bohner.
Charles W. W. Campbell.
J. Wilbur Gledhill.
Frederick H. Hughes.
William W. King.
J. Clarence Reinmiller.
Charles E. Sommer.
W. G. Durian.
Rebecca Rosenstein
Scotland:
Angus C. McInnes.
South Carolina:
Annie L. Dwight.
South Dakota:
Jessie A. Beardsley.
Ella S. Olen.
Ada R. Studt.
Texas:
Robert L. Davis.
Mary B. Sharp.
Thomas L. Anderson.
Grover C. Farquhar.
Washington:
Bertha Thiessen.
Alice S. Hammond.
West Virginia:
E. E. Sparks.
Wisconsin:
Harry Hansmann.
Harold Linde.
Otto Schulze.
Helen Wilcox.
Wyoming:
Baxter W. Mosey.

Catalogue of students and pupils—Continued.

IN THE KENDALL SCHOOL.

MALES.

Connecticut:
Walter C. Rockwell.
Delaware:
Walter Carmean.
Robert Johnston.
Arthur Long.
Lewis J. Long.
Raymond Webb.
District of Columbia:
Raymond Allen.
Benjamin Beaver.
Frank Berman.
Wallace Edington.
Morton W. Galloway.
William A. Gray.
Frederick D. Hill.
William U. Lynch.
John McIntosh.
John C. Miller.
James A. Nash.
Francis E. Ridgeway.
Sylvan J. Riley.
Charles Shepherd.
Leonard Stark.
Joseph Stinson.
Charles Sullivan.
Philip Thompson.
Antoni Cicchino.
Henry Stegemerten.
Minnesota:
Harvey Flanagan.
New York:
Clinton F. C. Ensworth.
Robert E. Conley.
South Carolina:
Osgood A. Darby.

FEMALES.

Delaware:
Ida Ellingsworth.
Cynthia Hearne.
Florence Johnston.
Isabelle Long.
Ellen J. McCabe.
Mary O'Rourke.
Olivia Peterson.
Glendora Taylor.
Mabel M. Sines.
Annie Lynch.
District of Columbia:
Mary E. Blocher.
Myrtle E. Connick.
Louise Golding.
Elsie Hutchins.
Margaret M. Lewis.
Matilda Maddox.
Annie P. Neitzey.
Virgie E. O'Neill.
Pearl J. Pearson.
Sophia Stansbury.
Laura Sykes.
Alice Woolford.
Florence Young.
Mildred Mojonnier.
Illinois:
Rose Edna Congdon.
West Virginia:
Frances V. Wagner.

REGULATIONS.

I. The academic year is divided into three terms, the first beginning on the Thursday before the last Thursday in September and closing on the 24th of December, the second beginning the 2d of January and closing the last of March, the third beginning the 1st of April and closing the Wednesday before the last Wednesday in June.

II. The vacations are from the 24th of December to the 2d of January, and from the Wednesday before the last Wednesday in June to the Thursday before the last Thursday in September.

III. There are holidays at Thanksgiving, Washington's Birthday, Easter, and Decoration Day.

IV. The pupils may visit their homes during the regular vacations and at the above-named holidays, but at no other time, unless for some special, urgent reason, and then only by permission of the president.

V. The bills for the maintenance and tuition of pupils supported by their friends must be paid semiannually in advance.

VI. The charge for pay pupils is $250 per annum. This sum covers all expenses in the primary department except clothing, and all in the college except clothing and books.

VII. All deaf-mutes of teachable age, of good mental capacity, and properly belonging to the District of Colmbia, are received without charge. To students from the States and Territories who have not the means of defraying all the

expenses of the college course the board of directors renders such assistance as circumstances seem to require, as far as the means at its disposal will allow.

VIII. It is expected that the friends of the pupils will provide them with clothing, and it is important that upon entering or returning to the institution they should be supplied with a sufficient amount for an entire year. All clothing should be plainly marked with the owner's name.

IX. All letters concerning pupils or applications for admission should be addressed to the president.

X. The institution is open to visitors during term time on Thursdays only, between the hours of 10 a. m. and 3 p. m. Visitors are admitted to chapel services on Sunday afternoons at 3 o'clock.

XI. Congress has made provision for the education, at public expense, of the indigent blind of teachable age belonging to the District of Columbia. Persons desiring to avail themselves of this provision are required by law to make application to the president of this institution.

REPORT OF THE FREEDMEN'S HOSPITAL.

ROSTER OF OFFICERS.

ADVISORY VISITING STAFF.

Edward A. Balloch, M. D.,
Edward D. Williston, M. D.,
John R. Francis, M. D.,
William F. Sowers, M. D.,
J. B. Nichols, M. D.,
James J. Richardson, M. D.,
William L. Robins, M. D.

STAFF.

W. A. Warfield, M. D., *Surgeon in Chief.*
S. L. Carson, M. D., *Assistant Surgeon.*

VISITING STAFF.

MEDICAL.

J. B. Nichols, M. D., Caryl Burbank, M. D., Thomas Martin, M. D., Harry P. Parker, M. D., Robert W. Brown, M. D., William B. Hudson, M. D., James R. Wilder, M. D.

SURGICAL.

Edward A. Balloch, M. D., William F. Sowers, M. D., William A. Jack, Jr., M. D., Edwin M. Hasbrouck, M. D.

GYNECOLOGICAL.

Austin M. Curtis, M. D., William C. McNeill, M. D., Howard Hume, M. D.

OBSTETRICS.

John N. Perry, M. D., Edward D. Williston, M. D., John R. Francis, M. D., Edward E. Morse, M. D

PEDIATRICS.

John W. Mitchell, M. D., Noble P. Barnes, M. D.

EYE.

Robert S. Lamb, M. D. Assistants: Albert R. Collins, M. D., Martha M. B. Lyon, M. D

EAR, NOSE, AND THROAT.

James J. Richardson, M. D. Assistants: Reginald R. Walker, M. D., Hamilton Martin, M. D.

GENITO-URINARY.

H. Atwood Fowler, M. D. Assistant: Milton A. Francis, M. D.

NERVOUS AND MENTAL DISEASES.

William L. Robins, M. D. Assistant: Joseph C. Tappan, M. D.

ORTHOPEDICS.

William G. Erving, M. D. Assistant: Karl C. Corley, M. D.

DERMATOLOGY.

Arthur J. Hall, M. D.

BACTERIOLOGIST.

Walter W. Alleger, M. D. Assistant: Charles H. Bowker, M. D.

NECROSCOPIST.

Daniel S. Lamb, M. D.

PATHOLOGIST.

Collins Marshall, M. D.

X RAY.

Herbert C. Scurlock, M. D.

OUT PATIENT DEPARTMENT.

MEDICAL.

H. W. Lawson, M. D., C. A. Tignor, M. D., E. B. Jones, M. D., E. H. Reede, M. D., U. G. Daniels, M. D., H. H. Hazen, M. D., H. W. Freeman, M. D.

MINOR SURGERY.

Milton A. Francis, M. D., C. W. Childs, M. D.

EYE.

Robert S. Lamb, M. D. Assistants: Martha M. B. Lyon, M. D., Albert R. Collins, M. D., James C. Dowling, M. D.

EAR, NOSE, AND THROAT.

James J. Richardson, M. D. Assistants: Reginald R. Walker, M. D., Hamilton Martin, M. D.

NERVOUS AND MENTAL DISEASES.

William L. Robins, M. D. Assistant: Joseph C. Tappan, M. D.

GYNECOLOGY.

William C. McNeill, M. D. Assistants: Mary L. Brown, M. D., Charles H. Marshall, M. D.

ACTING SUPERINTENDENT OF NURSES.

Julia A. Duffy.

PHARMACIST AND ASSISTANT.

Edgar B. Keemer, J. L. Fitzgerald.

CLERK AND ASSISTANT.

Harry H. Cardozo, Thomas H. Greene.

REPORT OF THE FREEDMEN'S HOSPITAL.

WASHINGTON, *July 28, 1909.*

SIR: I have the honor to submit for your consideration a report of the work done at the Freedmen's Hospital during the fiscal year ended June 30, 1909.

This period represents the first complete fiscal year the institution has occupied the new building.

The work of the hospital has been conducted with a marked degree of success, due in great measure to the harmonious relations of its several departments and efficiency of service by those connected therewith. At the close of the preceding fiscal year there were 131 patients remaining in the hospital. During the year just ended 2,346 were admitted and 244 births occurred, a total of 2,721 under care.

Of these 1,836 were residents of the District of Columbia and 885 were from the States.

Two thousand five hundred and ninety-two were discharged, their conditions being as follows: 1,288 recovered, 915 improved, 121 unimproved, 7 not treated, and 261 died, leaving 129 in the hospital July 1, 1909. Of the deaths, 57 occurred within forty-eight hours after admittance, being absolutely beyond human aid when received and were only admitted as an act of humanity.

In the out-patient department the following were treated: Medical, 1,457; surgical, 300; ear, nose and throat, 479; eye, 313; gynecological, 192; nervous, 134; skin, 258; genito-urinary, 225; total, 3,358, making a total of 6,210, in and out patients, receiving the benefits of the hospital.

Eight hundred and seventy-seven surgical operations were performed—a larger proportion of which being of a major nature than ever before.

Patients from the District of Columbia are admitted under a contract with the Board of Charities at the following rates: Adults $1.10 per day, children $0.65 per day, and infants $0.40 per day. The appropriation by Congress for this purpose was $25,500. The bills rendered for the care and treatment of District patients amounted to $38,846.40, or $13,346.40 more than the appropriation. It would seem reasonable that the Commissioners of the District of Columbia should make their estimates to Congress based upon the actual number of District patients sent to the hospital.

The number of persons refused admission was 141, fifty-five of which were due to lack of available beds at the time of application and 86 were not proper subjects for treatment in this hospital.

The following tables show in classified detail the medical and surgical work, with results:

Medical and surgical diseases.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.									
		Male.	Female.	Male.	Female.	Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
Bones and joints.													
Bones:													
Osteo-myelitis—													
Finger				1		1		1				1	
Sternum				1	1	2	2					2	
Tibia				2	1	3	2					2	1
Femur				1		1							1
Vertebra					2	2	1					1	1
Necrosis of nasal bones					1	1					1	1	
Periostitis				3	2	5		4	1			5	
Joints:													
Tuberculosis—													
Chondro-sternal				1		1		1				1	
Elbow				1		1		1				1	
Hip				6	5	11	1	10				11	
Knee				1	2	3	1	2				3	
Sacrum					1	1					1	1	
Spine				1	3	4	1	2			1	4	
Wrist				2		2		2				2	
Charcot's knee				1		1	1					1	
Deformed toe				1		1	1					1	
Contracted forearm					1	1		1				1	
Ankylosis of knee				1		1							1
Ankylosis of elbow					1	1							1
Genu valgum				1	1	2	2					2	
Subluxations—													
Ankle		1		4	2	7	4	2				6	1
Hip				1	3	4		4				4	
Knee					1	1	1					1	
Wrist	2				1	3	2	1				3	
Synovitis—													
Knee	1			3	1	5		5				5	
Wrist				1		1		1				1	
Gonorrheal arthritis		1		14	1	16	3	12				15	1
Luxations—													
Femur				1	1	2		2				2	
Humerus		2		6	2	10	1	9				10	
Skin diseases.													
Dermatitis		1	1	2	1	5	2	1				3	2
Eczema	1			1		2	2					2	
Scabies				1	3	4	2	2				4	
Frost bite				2	1	3	2	1				3	
Abscess, ulcers, and infections.													
Abscess:													
Alveolar				4	1	5	2	3				5	
Axillary		1		1		2	1	1				2	
Cervical				1		1		1				1	
Breast					3	3		2				2	1
Ear					1	1			1			1	
Hand					1	1		1				1	
Inguinal					1	1		1				1	
Ischio-rectal	2			10	8	20	8	11	1			20	
Liver					1	1					1	1	
Lung					1	1		1				1	
Leg				1		1		1				1	
Pelvic					6	6	2	2	1		1	6	
Peri-nephritic				1		1		1				1	
Peri-urethral	1			1		2		2				2	
Psoas	2			1	1	4		1			2	3	1
Subphrenic				2		2	1				1	2	
Scapular				1		1		1				1	
Testicle				1		1	1					1	
Thigh				1		1	1					1	
Vulva					1	1		1				1	

Medical and surgical diseases—Continued.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.									
		Male.	Female.	Male.	Female.	Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
Abscess, ulcers, and infections—Continued.													
Ulcer:													
Arm				1	1	2		2				2	
Axilla					1	1		1				1	
Foot				2	2	4	2	2				4	
Gastric				1		1		1				1	
Leg	4		1	7	21	33	14	13	1			28	5
Infection:													
Arm				1	2	3	2	1				3	
Axilla				1		1	1					1	
Foot				3	2	5	2	3				5	
Hand				4		4	1	3				4	
Leg				4	1	5	2	2				4	1
Post operative		1		3	4	8	2	6				8	
Thigh				3		3		2				2	1
Infectious diseases.													
Erysipelas			1	1		2	1		1			2	
Malaria	1	2		7	7	17	7	8	1			16	1
Measles				4		4	3	1				4	
Typhoid	5	2		41	16	64	49	4			10	63	1
Tetanus				2		2					2	2	
Influenza				3	5	8	3	5				8	
Constitutional diseases.													
Senile debility	1				1	2		1				1	1
Heat exhaustion		1		5	1	7	4	2			1	7	
Rachitis	3					3		3				3	
Marasmus			1	11	8	20	3	4			13	20	
Rheumatism:													
Acute	8	2		31	11	52	10	37			2	49	3
Chronic articular		1		1	4	6	1	3				4	2
Muscular		1		5	3	9	2	6				8	1
Syphilis:													
Hereditary				3	1	4	1	3				4	
Primary		1		29	18	48	2	38	4			44	4
Secondary	2			10	6	18		17				17	1
Tertiary				11	5	16		10			3	13	3
Tumors.													
Carcinoma:													
Breast	2				6	8	1	3	1		2	7	1
Bladder					2	2					2	2	
Cæcum					1	1							1
Jaw					1	1	1					1	
Liver	1					1					1	1	
Neck				2	1	3	1		1		1	3	
Pectoral fascia				1		1					1	1	
Rectum				1	2	3		1			2	3	
Stomach		1		4		5		1	2		2	5	
Fibroma:													
Breast	1				2	3	2	1				3	
Foot					1	1	1					1	
Leg					1	1		1				1	
Lipoma:													
Breast					1	1	1					1	
Neck				1		1		1				1	
Shoulder				4	2	6	4	2				6	
Sarcoma:													
Breast					1	1	1					1	
Femur				1	2	3	1	1				2	1
Foot					1	1	1					1	
Humerus				2		2		2				2	
Inguinal					1	1							1
Jaw				1	3	4	2	1	1			4	
Rectum					1	1		1				1	
Tongue				1		1			1			1	
Scalp				1		1	1					1	
Hip					1	1		1				1	
Goiter					1	1	1					1	

Medical and surgical diseases—Continued.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.									
		Male.	Female.	Male.	Female.	Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
Eye, ear, nose, and throat.													
Cataract:													
Senile	1			2	4	7	2	3				5	2
Traumatic				3		3		3				3	
Congenital					1	1		1				1	
Conjunctivitis					1	1	1					1	
Choroiditis, disseminated				1		1		1				1	
Glaucoma				1		1		1				1	
Incised wound of eyeball				1		1	1					1	
Irido-cyclitis					1	1		1				1	
Iritis	1			3	2	6	1	5				6	
Hordeolum					1	1		1				1	
Hypopyon				1		1	1					1	
Keratitis				6	3	9	2	6				8	1
Neuroretinitis		1		2		3		3				3	
Ophthalmia, gonorrheal				2	3	5	2	3				5	
Ptosis				1		1	1					1	
Ear:													
Mastoiditis				1	1	2	1	1				2	
Otitis media				2	1	3		2			1	3	
Stenosis, eustachian tube				1		1		1				1	
Nose:													
Sinitis, frontal				1		1		1				1	
Ozena		1				1		1				1	
Rhinitis		1		1		2		2				2	
Throat:													
Pharyngitis—													
Acute				1		1	1					1	
Chronic				1		1			1			1	
Tonsilitis—													
Acute				6	6	12	4	8				12	
Chronic	1			3	1	5	3	2				5	
Obstetrics and gynecology.													
Abortion:													
Complete					32	32	28				3	31	1
Incomplete	2				4	6	6					6	
Antiversion					2	2	2					2	
Amenorrhea					1	1			1			1	
Cystic ovary and pyosalpinx					3	3	1				2	3	
Cystic ovary and salpingitis					20	20	18	1	1			20	
Dysmenorrhea					1	1	1					1	
Eclampsia, puerperal					3	3					3	3	
Endometritis	3				29	32	15	15	2			32	
Ectopic gestation	1				5	6	3				1	4	2
Fibroid of uterus					22	22	17	2	3			22	
Carcinoma of cervix					33	33	1	9	11		11	32	1
Cystic ovary					33	33	13	9	8	1		31	2
Cystic ovary and fibroid	1				5	6	6					6	
Premature birth			1	10	7	18					18	18	
Pregnancy	16		2		308	326	291		15		2	308	18
Births	12	1	1	124	106	244	240					240	4
Pyosalpinx	3				32	35	22	7	6			35	
Hydrosalpinx					2	2	2					2	
Lacerated cervix					11	11	6	2	3			11	
Lacerated perineum	2				5	7	5	2				7	
Leucorrhea					1	1		1				1	
Ovaritis					15	15	1	9	1	1		12	3
Procidentia	1				3	4		2				2	2
Infants with mothers				4	3	7				5		5	2
Retained placenta					14	14	12					12	2
Retroflexion					1	1	1					1	
Subinvolution	2					2	2					2	
Miscarriage					6	6	6					6	
Menopause					1	1		1				1	
Prolapsed uterus, cystic ovary					3	3	2	1				3	
Lacerated cervix, cystic ovary					2	2	1	1				2	
Hydrosalpinx, cystic ovary					2	2	2					2	
Parovarian cyst, cystic ovary					1	1	1					1	
Appendicitis, cystic ovary					2	2	2					2	
Retroverted uterus, cystic ovary					1	1	1					1	
Multilocular ovarian cyst					1	1	1					1	

Medical and surgical diseases—Continued.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.									
		Male.	Female.	Male.	Female.	Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
Obstetrics and gynecology—Con.													
Lacerated perineum, cystic ovary					1	1			1			1	
Ovarian cyst					1	1					1	1	
Retroflexed uterus, cystic ovary					2	2	2					2	
Prolapsed uterus					5	5	2	3				5	
Hyper emesis graviderum					4	4	2	2				4	
Multilocular adeo-cystoma					1	1					1	1	
Puerperal septicæmia					5	5					5	5	
Recto-vaginal fistula					2	2		1			1	2	
Vesico-vaginal fistula					3	3	1	1			1	3	
Dermoid cyst, salpingitis					1	1	1					1	
Salpingitis					4	4	2	2				4	
Mastitis					2	2		2				2	
Submucous fibroid, cystocele					1	1	1					1	
Fibroid and dermoid cyst					1	1	1					1	
Fibroid and salpingitis					1	1	1					1	
Polypus, cervical					3	3	2					2	1
Fibroid, pyosalpinx					2	2	1	1				2	
Hematoma of ovary					2	2	2					2	
Adeno-papillomata					1	1							1
Fibroid and pregnancy					1	1							1
Ruptured hymen					1	1			1			1	
Hypertrophy of cervix					1	1		1				1	
Rectocele					1	1		1				1	
Phlegmasia alba dolens					1	1		1				1	
Dystocia					1	1	1					1	
Phantom tumor					1	1		1				1	
Cervicitis and cystitis					1	1		1				1	
Pelvic adhesions					1	1		1				1	
Nervous system.													
Aphasia				1		1		1				1	
Cephalagia	4							4				4	
Cerebral concussion				4	1	5	1	3			1	5	
Cerebral embolus				3	4	7	2	4			1	7	
Cerebral hemorrhage				5	6	11		1	1		8	10	1
Cerebral thrombosis		1			2	3		2				2	1
Dementia, senile				1	1	2		2				2	
Epilepsy	2			9	2	13		13				13	
Hysteria				1	13	14	5	7	2			14	
Hemiplegia				1		1		1				1	
Herpes zoster				1		1		1				1	
Insanity, delusional					4	4		3	1			4	
Locomotor ataxia				2		2		2				2	
Paralysis, facial				1		1		1				1	
Paralysis, spastic spinal				1		1		1				1	
Paresis				1	2	3							3
Meningitis				1	3	4			1		3	4	
Neuralgia, facial				2	1	3	2	1				3	
Neurasthenia		2		1	9	12	1	10	1			12	
Neuritis		1			1	2		1				1	1
Myelitis, transverse					1			1				1	
Vertigo		1		3	1	5	1	4				5	
Cerebral congestion				1		1		1				1	
Microcephalus			1			1					1	1	
Respiratory system.													
Asthma:													
Bronchial		1		3	2	6		6				6	
Cardiac	2					2		2				2	
Bronchitis:													
Acute				14	4	18	12	6				18	
Subacute				3	3	6	4	2				6	
Chronic		1		1	5	7	2	3				5	2
Emphysema				2	2	4		2			2	4	
Pleurisy:													
Acute		1		9	10	20	7	11				18	2
Chronic				3	2	5	2	3				5	
Pneumonia:													
Lobar		1		31	15	47	25	8			13	46	1
Lobular				5	2	7		2			5	7	

Medical and surgical diseases—Continued.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.									
		Male.	Female.	Male.	Female.	Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
Respiratory system—Continued.													
Tuberculosis:													
Pulmonary	1	1	....	25	15	42	.....	14	17	....	10	41	1
General	.....	.....	.....	3	4	7	.....	.....	3	....	4	7	.....
Odema of lungs	.....	.....	1	.....	.....	1	.....	.....	.....	.....	1	1	.....
Congenital atelectasis	.....	.....	.....	1	1	2	.....	.....	.....	.....	2	2	.....
Digestive system.													
Appendicitis	1	.....	.....	13	25	39	22	9	.....	.....	7	38	1
Cholera infantum	2	.....	.....	.....	.....	2	.....	2	.....	.....	.....	2	.....
Constipation	.....	.....	.....	6	5	11	6	5	.....	.....	.....	11	.....
Diarrhea	.....	1	.....	3	1	5	.....	5	.....	.....	.....	5	.....
Dysentery	1	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....
Enteritis	.....	.....	.....	8	3	11	6	2	.....	.....	.....	8	3
Fissure of rectum	.....	.....	.....	2	.....	2	.....	2	.....	.....	.....	2	.....
Fistula in ano	.....	1	1	6	8	16	6	10	.....	.....	.....	16	.....
Gastro-enteritis	.....	.....	.....	10	5	15	3	8	.....	.....	4	15	.....
Gastritis:													
Acute	.....	2	.....	22	17	41	8	31	.....	.....	1	40	1
Chronic	.....	2	.....	8	8	18	.....	16	.....	.....	.....	16	2
Hernia:													
Inguinal	.....	.....	.....	31	1	32	27	4	.....	.....	.....	31	1
Femoral	.....	.....	.....	.....	2	2	.....	2	.....	.....	.....	2	.....
Umbilical	.....	.....	.....	6	3	9	9	.....	.....	.....	.....	9	.....
Intestinal obstruction	.....	.....	.....	3	3	6	2	.....	.....	.....	4	6	.....
Liver:													
Cirrhosis	.....	.....	.....	2	1	3	.....	2	.....	.....	1	3	.....
Cholecystitis	.....	.....	.....	1	1	2	1	1	.....	.....	.....	2	.....
Peritonitis	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	1
Prolapsed rectum	.....	.....	.....	1	.....	1	1	.....	.....	.....	.....	1	.....
Stomatitis	1	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....
Stricture of rectum	.....	.....	.....	1	2	3	.....	1	2	.....	.....	3	.....
Genito-urinary.													
Balanitis	.....	.....	.....	1	.....	1	1	.....	.....	.....	.....	1	.....
Carcinoma of penis	.....	.....	.....	3	.....	3	.....	2	1	.....	.....	3	.....
Chancroid	.....	.....	.....	44	.....	44	11	29	2	.....	.....	42	2
Condylomata	.....	.....	.....	4	8	12	2	10	.....	.....	.....	12	.....
Cystitis—													
Acute	3	.....	.....	4	4	11	5	5	.....	.....	.....	10	1
Chronic	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	1
Epididymitis	.....	.....	.....	7	.....	7	2	5	.....	.....	.....	7	.....
Gonorrhea—													
Acute	6	2	.....	14	4	26	13	11	2	.....	.....	26	.....
Chronic	.....	.....	.....	2	3	5	1	2	2	.....	.....	5	.....
Hematuria	.....	.....	.....	3	.....	3	1	2	.....	.....	.....	3	.....
Hydrocele	.....	1	.....	6	.....	7	4	2	1	.....	.....	7	.....
Fistula, urethral	.....	.....	.....	1	1	2	1	1	.....	.....	.....	2	.....
Nephritis:													
Interstitial	.....	1	.....	15	16	32	2	14	3	.....	12	31	1
Parenchymatous	.....	2	.....	11	6	19	1	7	.....	.....	11	19	.....
Orchitis	.....	.....	.....	2	.....	2	1	1	.....	.....	.....	2	.....
Phimosis	.....	.....	.....	23	.....	23	19	1	2	.....	.....	22	1
Prostatic hypertrophy	.....	2	.....	10	.....	12	2	8	.....	.....	1	11	1
Pyelitis	.....	.....	.....	2	1	3	1	1	.....	.....	.....	2	1
Retention of urine	.....	.....	.....	5	1	6	2	4	.....	.....	.....	6	.....
Calculi:													
Renal	.....	.....	.....	2	.....	2	1	1	.....	.....	.....	2	.....
Urinary	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	1	.....
Stricture, urethral	.....	1	.....	18	.....	19	6	13	.....	.....	.....	19	.....
Circulatory system.													
Angina pectoris	.....	1	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....
Aneurism:													
Aortic	.....	.....	.....	1	1	2	.....	2	.....	.....	.....	2	.....
Popliteal	1	.....	.....	1	.....	2	.....	1	.....	.....	1	2	.....
Aortic insufficiency	.....	.....	.....	16	3	19	.....	14	.....	.....	5	19	.....
Aortic stenosis	.....	.....	1	2	2	5	.....	3	.....	.....	2	5	.....
Arterio-sclerosis	1	4	.....	3	3	11	.....	9	.....	.....	2	11	.....
Epistaxis	2	.....	.....	1	.....	3	3	.....	.....	.....	.....	3	.....

Medical and surgical diseases—Continued.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
		Male.	Female.	Male.	Female.								
Circulatory system—Continued.													
Endocarditis				2	1	3		3				3	
Gangrene				3	5	8	6				2	8	
Hemorrhage				2	3	5	1				4	5	
Hemorrhoids	2	1		11	4	18	11	5	1			17	1
Lithemia		1				1		1				1	
Mitral insufficiency	5			15	13	33		14			15	29	4
Septicemia		2	2	5		9	1				8	9	
Pericarditis					1	1	1					1	
Varicose veins		4		2	3	9	3	5	1			9	
Lymphatics and peritoneum.													
Adenitis:													
Cervical	1			5	18	24	8	12	2			22	2
Inguinal	4			1		5	5					5	
Submaxillary					1	1		1				1	
Elephantiasis					1	1			1			1	
Lymphangitis					1	1		1				1	
Tubercular peritonitis				2	4	6					5	5	1
Injuries.													
Burns:													
Arm					2	2		1				1	1
Body	1			3	2	6	2				4	6	
Face		1		2	1	4	4					4	
Leg				2		2	1	1				2	
Fractures:													
Colles	1				2	3		3				3	
Femur	1	1		6	3	11	3	1			5	9	2
Fibula and tibia		1		5	1	7	6					6	1
Finger		1		3		4	4					4	
Humerus	1			9	2	12	8				2	10	2
Jaw	1					1	1					1	
Ribs	2				1	3	1	1			1	3	
Skull		3	2	3		8	4				4	8	
Nose				1		1		1				1	
Clavicle		1		4	1	6	6					6	
Fibula				1		1	1					1	
Ulna					1	1	1					1	
Patella		1				1							1
Wounds:													
Contused—													
Abdomen					1	1		1				1	
Ankle				2	1	3		3				3	
Back		2				2		2				2	
Chest				3		3	1	2				3	
Face				1	1	2	1	1				2	
Knee				2	1	3	1	2				3	
Leg	1			2		3		3				3	
Neck				1		1		1				1	
Scalp				1		1		1				1	
Shoulder				4		4	2	2				4	
Thigh					2	2		2				2	
Gunshot—													
Ankle				2		2	2					2	
Back					1	1	1					1	
Chest				2		2	1	1				2	
Face				2		2	2					2	
Knee				1		1		1				1	
Leg		1		1		2	2					2	
Thigh	1			1		2	1				1	2	
Incised—													
Face				2		2		2				2	
Leg				2		2	1	1				2	
Scalp		1		1	1	3		3				3	
Lacerated—													
Face		1		1		2		2				2	
Leg		1		2	2	5	1	3				5	
Scalp		1	1	1		3		2	1			3	
Scrotum				1		1		1				1	
Vulva					1	1		1				1	

Medical and surgical diseases—Continued.

Disease.	Remaining July 1, 1908.	Admitted.					Discharged.						Remaining July 1, 1909.
		White.		Colored.									
		Male.	Female.	Male.	Female.	Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.	
Injuries—Continued.													
Wounds—Continued.													
Punctured—													
Abdomen				1		1	1					1	
Foot				1		1		1				1	
Foreign bodies—													
Foot				1		1		1				1	
Knee				1		1	1					1	
Hand		1		3	1	5	5					5	
Poisons—													
Alcoholism		26	1	29	12	68	25	34	2		4	65	3
Autointoxication				1	1	2		2				2	
Carbolic acid					1	1		1				1	
Gas, illuminating		1				1	1					1	
Mercury					1	1	1					1	
Morphine		1				1		1				1	
Coroner's cases			2	2		4					4	4	
Total	131	105	20	1,082	1,383	2,721	1,288	915	121	7	261	2,591	129

Operations and results.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Appendectomy	Appendicitis			4	12	16	13	1		2
	Appendicitis, ruptured			1		1	1			
	Appendicitis, gangrenous			1	1	2	2			
Amputation	Chronic mastitis of breast				1	1	1			
	Gangrene of leg			3	2	5	4			1
	Gangrene of toes			1	1	2	2			
	Gangrene of fingers			1		1	1			
	Gangrene of foot			1	1	2	2			
	Tuberculosis of foot			2		2	2			
	Hypertrophy of cervix uteri				1	1	1			
Halsted's	Carcinoma of breast				1	1	1			
	Epithelioma of penis			2		2	2			
Arthrectomy	Tuberculosis of knee			3		3	1	2		
Circumcision	Elongated prepuce	2		8		10	9	1		
Cauterization	Carcinoma of cervix uteri				2	2		1	1	
	Condylomata of vulva				3	3	2	1		
	Condylomata of anus			2		2	2			
Curettage	Retained placenta				18	18	14	1		3
	Chronic dysmenorrhœa				6	6	6			
	Chronic endometritis				5	5	5			
	Chancroidal ulcer of vulva				2	2	2			
	Tuberculosis of tibial fascia				1	1		1		
Craniectomy	Microcephalus		1			1				1
Cholecystotomy	Cholelithiasis			1	1	2	2			
Cystotomy, subpubic	Vesical calculus				1	1	1			
Celiotomy:										
Salpingo-oophorectomy	Ectopic gestation				4	4	3			1
	Pyosalpinx and cystic ovary				21	21	19			2
	Hydrosalpinx and cystic ovary				7	7	7			
	Pyosalpinx and cystic ovary, bilat				11	11	11			
Hystero-salpingo-oophorectomy.	Myo-fibroma, cystic ovary				8	8	8			
	Fibroid of uterus and bilateral pyosalpinx.				6	6	6			
Salpingectomy	Pyosalpinx, bilateral				8	8	8			
Oophorectomy	Multi-locular cyst of ovary				5	5	4			1
	Cyst of ovary				6	6	6			
	Cyst of ovary, bilateral				5	5	5			

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Celiotomy—Continued.										
Oophorectomy and appendectomy.	Cystic ovary and appendicitis				7	7	7			
Hysterectomy	Fibroid of uterus				12	12	11			1
	Carcinoma of cervix				1	1				1
Hysterectomy, vaginal	do				2	2		1		1
Salpingo-Oophorectomy, appendectomy.	Pyosalpinx, cystic ovary and appendicitis.				5	5	4			1
Myomectomy	Fibroid of uterus				4	4	4			
Porro's cæsarian	Fibroid of uterus, pregnancy				1	1	1			
Exploratory	Tubercular peritonitis				2	2		1	1	
Ventral fixation	Procidentia				3	3	2	1		
Gastro-enterostomy	Carcinoma of pylorus			2		2	1			1
Colotomy, inguinal	Stricture of rectum				1	1				1
Dilatation and perineal section.	Stricture of urethra			4		4	3	1		
Enucleation	Cataract			1	4	5	5			
	Incised wound of eyeball			1		1	1			
	Hypertrophy of prostate			3		3	2	1		
Extirpation	Sebaceous cyst of scalp			2		2	2			
	Fibrous tumor of leg				1	1	1			
	Cervical adenitis		1	2	16	19	18	1		
	Cervical adenitis, bilateral			4	1	5	5			
	Inguinal adenitis			2	1	3	3			
	Needle in knee			1		1	1			
	Sarcoma of breast			1		1				1
	Varicose veins				4	4	4			
Excision	Recto-vaginal fistula				2	2	2			
	External hemorrhoids		2	3	2	7	7			
	Polypus				1	1	1			
	Sarcoma of lower jaw				1	1	1			
	Fistula in ano		3	10	3	16	13	2	1	
	Rectal ulcer			1		1	1			
	Hypertrophy of labia minora				1	1	1			
	Adeno-fibroma of breast				2	2	2			
	Peri-rectal fistula			1		1		1		
	Sequestrum of tibia			5	1	6	4	2		
	Tuberculosis of sacrum				1	1				1
	Lipoma of back			2	1	3	3			
	Tuberculosis of sternum			1	1	2		2		
	Ptosis			2		2		2		
	Epithelioma of lip				1	1	1			
	Cicatritial tissue of thigh			1		1	1			
	Chancroidal ulcer of penis			4		4	4			
Exploritory incision	Fracture of base of skull			1		1				1
Herniotomy	Umbilical hernia			2	3	5	5			
	Strangulated inguinal hernia			3		3	3			
	Incarcerated inguinal hernia			1		1	1			
	Congenital inguinal hernia			6		6	6			
	Inguinal hernia			9		9	9			
	Inguinal hernia, bilateral			3		3	3			
	Inguinal hernia, direct			2		2	2			
	Inguinal hernia and hydrocele of cord.			1		1	1			
	Femoral hernia				1	1				1
Incision, drainage	Abscess of arm	1		2		3	3			
	Abscess of leg				1	1		1		
	Abscess of breast				3	3	3			
	Abscess of inguinal glands			1	2	3	2	1		
	Stricture of urethra, multiple			2		2	2			
	Stricture of rectum				2	2	1			1
	Cellulitis of forearm			2		2	2			
	Cellulitis of foot	1	1	2	4	8	8			
	Cellulitis of hand	6	1	18	12	37	35	2		
	Cellulitis of arm				1	1	1			
	Cellulitis of arm and forearm	1		1		2	1			1
	Cellulitis of leg			2		2	1	1		
	Cellulitis of knee			1		1	1			
	Peri-nephritic abscess			1		1	1			
	Chancroid and phimosis			2		2	2			
	Gunshot wound of knee			1		1	1			
	Ischio-rectal abscess			3	1	4	4			
	Ulcer of leg				2	2	2			
Incision, stretching	Neuritis of musculo-spiral nerve	1				1		1		
Ligation	Varicose veins of leg			1	1	2	2			
Laminectomy	Fracture of lumbar vertebra			1		1	1			

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Mastoidectomy	Mastoiditis	....	....	2	1	3	3	....	....	....
Nephrectomy	Pyelitis, suppurative	....	....	1	....	1	1	....	....	....
Osteotomy	Genu valgum	....	....	....	1	1	1	....	....	....
Perineal section	Stricture of urethra	....	....	3	....	3	3	....	....	....
Plastic work	Sloughing scrotum	....	....	1	....	1	....	1	....	....
Phlebectomy	Thrombo-phlebitis	....	....	....	1	1	....	1	....	....
Perineorrhaphy	Lacerated perineum	....	....	....	4	4	3	1	....	....
Prostectomy	Hypertrophy of prostate	....	....	2	....	2	2	....	....	....
Resection	Tuberculosis of knee	....	....	2	....	2	....	1	1	....
Reduction	Fracture of humerus	....	....	....	1	1	1	....	....	....
	Fracture of femur	....	....	....	1	1	1	....	....	....
Radical cure	Hydrocele	....	....	2	....	2	2	....	....	....
Shade's operation	Varicose veins	....	1	4	6	11	8	2	1	....
Skin grafting	Varicose ulcer	....	....	1	1	2	2	....	....	....
Suturing	Lacerated scalp	7	....	39	5	51	51	....	....	....
	Lacerated face	....	....	8	2	10	10	....	....	....
	Lacerated hand	3	....	25	2	30	28	2	....	....
	Lacerated leg	1	....	2	3	6	6	....	....	....
	Incised scalp	19	1	48	6	74	70	4	....	....
	Incised arm	1	....	3	1	5	5	....	....	....
	Incised hand	16	....	34	9	59	50	9	....	....
	Incised ear	....	....	2	1	3	3	....	....	....
	Incised chest	....	....	2	....	2	2	....	....	....
	Incised foot	....	....	4	....	4	4	....	....	....
Trephining	Fracture of skull, compound	2	1	1	....	4	1	....	....	3
Trachelorrhaphy	Lacerated cervix	....	....	....	6	6	6	....	....	....
Tonsillotomy	Hypertrophy of tonsil	....	....	42	34	76	76	....	....	....
Tonsillotomy by dissection	do	....	....	6	4	10	10	....	....	....
Wiring of bone	Fracture of femur	....	....	2	....	2	1	....	....	1
	Fracture of clavicle	....	....	2	....	2	1	1	....	....
	Fracture of humerus	....	....	1	....	1	1	....	....	....
Whithead's	Hemorrhoids	....	....	3	1	4	3	1	....	....
Turbinectomy	Hypertrophy of turbinates	....	....	19	7	26	26	....	....	....
Adenectomy	Adenoids	....	....	16	9	25	25	....	....	....
Incision	Peri-tonsillar abscess	....	....	7	8	15	15	....	....	....
Total		61	12	435	369	877	793	52	5	27

Obstetrical record.

Month.	White.		Colored.		Total.	Forceps.	Podalic version.	Placenta prævia.	Lacerations.	Postpartum hemorrhage.	Head.	Breech.	Foot.	Primipara.	Multipara.
	Male.	Female.	Male.	Female.											
July	....	....	10	8	18	1	....	....	....	1	17	1	....	9	9
August	....	....	13	8	21	1	....	....	1	....	20	....	1	9	12
September	....	....	11	5	16	....	1	....	....	....	16	....	....	9	7
October	....	....	13	8	21	1	....	....	....	1	21	....	....	7	14
November	....	....	12	12	24	....	....	....	....	....	23	1	....	12	12
December	....	....	9	7	16	....	1	....	....	....	15	1	....	8	8
January	1	....	4	15	20	....	1	....	2	....	20	....	....	10	10
February	....	....	11	9	20	2	....	1	....	....	20	....	....	12	8
March	....	1	10	11	22	2	....	....	....	....	19	2	1	10	12
April	....	....	11	13	24	2	....	....	....	....	24	....	....	13	11
May	....	....	13	12	25	....	....	....	....	....	25	....	....	11	14
June	....	....	9	8	17	2	....	....	1	....	15	1	1	10	7
Total	1	1	126	116	244	11	3	1	4	2	235	6	3	120	124

Cases treated in out-patient department.

Diagnosis.	White.		Colored.		
	Male.	Female.	Male.	Female.	Total.
Medical.					
Anæmia			2	11	13
Asthma:					
Bronchial	3		9	6	18
Cardiac	1				1
Adenitis, cervical			1	4	5
Aneurism			3		3
Aortic insufficiency			2	1	3
Aortic stenosis				1	1
Appendicitis			1		1
Arterio-sclerosis			16	3	19
Ascaris lumbricoides			1	1	2
Bronchitis:					
Acute			112	112	224
Chronic	4	1	49	61	115
Cardiac hypertrophy			2	3	5
Cardiac neurosis			1	3	4
Chlorosis				1	1
Cholera infantum			2		2
Constipation			36	90	126
Contusions	1		13	4	18
Coryza			17	15	32
Debility			4	9	13
Debility, senile			2	15	17
Diabetes mellitus			1		1
Endocarditis			2	2	4
Eneuresis			3	3	6
Enteritis			11	7	18
Febricula			4	3	7
Gastritis:					
Acute	2		61	104	167
Chronic			24	29	53
Hemophilia	1		2	2	5
Hepatitis			3	4	7
Influenza			4	3	7
Intestinal indigestion			15	24	99
Malaria			16	8	24
Measles			1		1
Migraine			4	1	5
Mitral insufficiency			14	20	34
Myalgia			21	16	37
Myocarditis			3	3	6
Marasmus			2	1	3
Nephritis:					
Acute			9	7	16
Chronic			11	12	23
Peritonitis			1		1
Pleurisy			12	4	16
Pleurodynia			4	5	9
Pneumonia:					
Lobar			3		3
Lobular			1	1	2
Phlebitis			1		1
Pulmonary tuberculosis			49	32	81
Rheumatism	4		68	69	141
Rickets			3	2	5
Scabies			1	1	2
Stomatitis			2	4	6
Synovitis			2	1	3
Tachycardia			1	3	4
Tinea circinata			2	1	3
Tinea saginata				1	1
Typhoid fever			2	1	3
Whooping cough			2		2
Miscellaneous—not diagnosed			44	44	88
Total	16	1	682	758	1,457
Surgical.					
Abscess:					
Abdomen			9	2	11
Head			3	2	5
Leg			2	2	4
Chest			2	2	4

Diagnosis.	White.		Colored.		
	Male.	Female.	Male.	Female.	Total.
Surgical—Continued.					
Adenitis:					
Cervical			3	1	4
Inguinal			14	1	15
Arthritis			2		2
Balanitis			1		1
Burns			1	1	2
Condylomata				3	3
Chancroids			12	2	14
Cysts			4	3	7
Chondromata			2		2
Dog bite			1		1
Endometritis				2	2
Epididymitis			1		1
Fractures:					
Clavicle			2	1	3
Metacarpal			2		2
Jaw			1		1
Radius			1	1	2
Ribs			2		2
Scapula			1		1
Tibia				1	1
Wrist				1	1
Foreign bodies in throat			8	2	10
Fistula in ano			3		3
Gangrene of foot			3		3
Hemorrhoids			3	1	4
Hernia, inguinal			1		1
Hematoma				1	1
Hydrocele			1		1
Infection:					
Hand			14	7	27
Head			1		1
Ingrown toe nail			4	1	5
Keloid				3	3
Lipoma			3	1	4
Orchitis			2		2
Phimosis			43		43
Retention of urine			3		3
Retained placenta				1	1
Sprains:					
Ankle			6	1	7
Foot			2		2
Knee			1		1
Shoulder			1		1
Wrist			2		2
Synovitis			2		2
Stricture of urethra			4		4
Tongue tie			1		1
Ulcer:					
Finger			1		1
Leg			2		2
Penis			1		1
Vaccination			25	24	49
Wounds:					
Contused			14	1	15
Incised			6	1	7
Lacerated			1	1	2
Punctured	1	1	2	2	6
Total	1	1	226	72	300
Gynecological.					
Amenorrhea				10	10
Chlorosis				1	1
Cystocele				5	5
Cystic ovary				6	6
Cervicitis				1	1
Cystitis				5	5
Condylomata of vulva				3	3
Dysmenorrhea				15	15
Displacements:					
Prolapse				5	5
Retroversion				14	14
Endometritis				33	33

Cases treated in out-patient department—Continued.

Diagnosis.	White.		Colored.		
	Male.	Female.	Male.	Female.	Total.
Gynecological—Continued.					
Fibroid of uterus				9	9
Leucorrhea				15	15
Lacerated cervix				10	10
Lacerated perineum				16	16
Metrorrhagia				6	6
Menorrhagia				8	8
Menopause				14	14
Ovaritis				18	18
Pruritis				1	1
Post operative adhesions				4	4
Pregnancy				22	22
Pyosalpinx				11	11
Salpingitis				5	5
Urethritis				11	11
Vaginitis				18	18
Vulvitis				1	1
Miscellaneous—not diagnosed				11	11
Total				282	282
Nervous diseases.					
Alcoholism	1				1
Anterior-polio-myelitis			1		1
Apoplexy			1		1
Anterio sclerosis			1		1
Cerebral congestion			2		2
Cerebral embolus			7	3	10
Cerebral syphilis			2		2
Chorea				1	1
Epilepsy			11	7	18
Hysteria				2	2
Migraine			3	3	6
Neuralgia			9	17	26
Neurasthenia	2		14	33	49
Paralysis agitans				1	1
Paralysis, facial				1	1
Locomotor ataxia			1		1
Sciatica			1		1
Tabes dorsalis			1	1	2
Miscellaneous				8	8
Total	3		54	77	134
Ear, nose, and throat.					
Adenoids			12	7	19
Abscess of external ear			2		2
Ceruminous impaction			5		5
Cyst, sublinguinal				1	1
Embedded tonsils			1	1	2
Epistaxis			1	2	3
Foreign body in ear			2		2
Hypertrophy of turbinates			25	6	31
Hypertrophy of tonsils			32	54	86
Inflammation, auditory meatus			6	3	9
Inflammation, Eustachian tube			1	1	2
Laryngitis:					
Acute			9	8	17
Chronic			1	2	3
Tubercular			1		1
Mastoiditis			1		1
Otitis media:					
Acute	1		10	6	17
Chronic	1		3		4
Papilloma of tonsil				1	1
Perforated tonsil				1	1

Diagnosis.	White.		Colored.		
	Male.	Female.	Male.	Female.	Total.
Ear, nose, and throat—Continued.					
Pharyngitis:					
Acute			26	34	60
Chronic			32	43	75
Post-pharyngeal abscess				1	1
Peritonsilar abscess			3	8	11
Rhinitis:					
Acute			4	4	8
Chronic, atrophic			4	7	11
Chronic, hypertrophic			8	5	13
Spur, nasal septum				1	1
Stomatitis			1	3	4
Tonsilitis:					
Acute			16	32	48
Chronic			6	3	9
Uvulitis			19	13	32
Total	2		230	247	479
Eye.					
Amblyopia				3	3
Angiosclerosis			2	4	6
Blepharitis			2	2	4
Cataract			3	5	8
Chalazion			5	9	14
Choroiditis			6	4	10
Circum-corneal hypertrophy			4	1	5
Conjunctivitis			41	43	84
Corneal ulcer			2	4	6
Ectropion	1		2		3
Glaucoma			2	1	3
Iritis			3	5	8
Keratitis			4	4	8
Leucoma			1	1	2
Optic atrophy			6		6
Optic neuritis			1	2	3
Ophthalmia neonatorum				2	2
Refractions			29	48	77
Retinitis			3	8	11
Trauma			4	2	6
Miscellaneous	2		21	21	44
Total	3		141	169	313
Genito-urinary.					
Chancre			1		1
Chancroid			16		16
Epididymitis			15		15
Gonorrhea	7		65	1	73
Hydrocele	1		2		3
Inguinal adenitis			9		9
Phimosis			13		13
Orchitis			1		1
Prostatitis:					
Acute			4		4
Chronic			17		17
Prostatic hypertrophy			7		7
Stricture of urethra	1		5		6
Urethritis—					
Acute			17		17
Chronic			27		27
Venereal warts			4		4
Unclassified	2		9		11
Total	11		213	1	225

Cases treated in out-patient department—Continued.

Diagnosis.	White.		Colored.		Total.	Diagnosis.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
Skin.						*Skin*—Continued.					
Acne			6	4	10	Syphilis—Continued.					
Dermatitis			4	2	6	Primary			13	1	14
Eczema	1		9	5	15	Secondary	3		49	35	87
Tuberculosis			1	1	2	Tertiary			29	14	43
Herpes zoster			7		7	Tinea circinata			3		3
Impetigo			1		1	Tinea tonsurans			6	1	7
Leucoderma			1	1	2	Urticaria			3	5	8
Pediculi capitis			2	1	3	Unclassified			3	1	4
Scabies			18	21	39						
Syphilis:						Total	4		158	96	258
Congenital			3	4	7						

Emergencies.

Month.	White.		Colored.		Total.	Month.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
July	15	2	65	25	107	February	6	1	24	14	45
August	19	4	54	25	102	March	6	1	46	9	62
September	14	1	37	18	70	April	21	1	35	13	70
October	12		72	17	101	May	16	5	55	13	89
November	15	1	63	19	98	June	8		49	19	76
December	14	2	41	15	72						
January	11		45	13	69	Total	157	18	587	200	961

Occupation of patients.

Occupation.	White.		Colored.		Total.	Occupation.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
Agent	1		5		6	Mechanic	8				8
Barber	2		18		20	Merchant	1		6		7
Bell boy			6		6	Messenger	1		6		7
Bootblack			14		14	Miner			3		3
Butler	1		5		6	Minister			3		3
Carpenter	3		4		7	Musician			10		10
Carpet layer			2		2	No occupation	6	7	100	50	163
Chambermaid				20	20	Nurse				15	15
Clerk	1		6		7	Painter	3		10		13
Coachman	1		6		7	Physician	1		2		3
Cook	1	3	6	10	20	Pianist			2		2
Dairyman	1				1	Plasterer	1		2		3
Domestic		6		937	943	Porter			20		20
Driver	4		30		34	Sailor	4		1		5
Electrician	2		1		3	Seamstress				60	60
Elevator man			14		14	Shoemaker			47		47
Engineer	1		1		2	Soldier	20		3		23
Farmer	5		21		26	Student	6		37	72	115
Fireman			4		4	Tailor	1		5		6
Grocer	1		10		11	Teacher	2	1	8	9	20
Hostler			10		10	Teamster			18		18
Huckster			12		12	Trained nurse				3	3
Iceman	2		1		3	Unknown	2		46	25	73
Janitor			7		7	Waiter			37		37
Laborer	20		400		420	Waitress				10	10
Laundress		2		54	56	Watchman	1		3		4
Lawyer			10		10						
Liveryman	1				1	Total	104	19	956	1,267	2,346

Nativity of patients.

Nativity.	White.		Colored.		Total.	Nativity.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
Alabama			2		2	New Jersey	1		6	7	14
Alaska	1				1	New York	2		9	8	19
Arkansas			1	1	2	North Carolina			8	11	19
California	1		2		3	Ohio	1		6	4	11
Colorado	1				1	Pennsylvania	1	1	21	37	60
Connecticut			3	1	4	South Carolina			4	8	12
Delaware			4	5	9	Tennessee	1			1	1
District of Columbia	17	6	294	432	749	Texas		1			1
Florida	1		2	1	4	Virginia	7	2	211	291	511
Georgia	1		7	5	13	West Virginia			29	31	60
Idaho		1			1	Canada	1			1	2
Illinois	1		6	3	10	Cuba			3		3
Indiana			1		1	France		1			1
Iowa		1			1	Germany	6				6
Kansas	1			1	2	Ireland	31	2			33
Kentucky			4	3	7	Italy	10				10
Louisiana				1	1	Russia	7	1			8
Maryland	6	2	296	389	693	Spain	1				1
Massachusetts	2		4	2	8	Unknown	2	1	24	18	45
Mississippi			8	7	15						
Montana	1				1	Total	104	19	956	1,267	2,346

Patients admitted each year for the past thirty-five years.

Year ending June 30:		Year ending June 30:		Year ending June 30:	
1875	190	1887	2,017	1899	2,374
1876	319	1888	1,997	1900	2,427
1877	500	1889	2,074	1901	2,414
1878	519	1890	2,392	1902	2,408
1879	642	1891	2,373	1903	2,677
1880	819	1892	2,331	1904	2,907
1881	892	1893	2,422	1905	2,918
1882	1,102	1894	2,801	1906	2,207
1883	1,373	1895	2,476	1907	2,366
1884	1,509	1896	2,596	1908	2,669
1885	1,794	1897	2,815	1909	2,590
1886	1,923	1898	2,355		

Summary.

	White.		Colored.		Total.
	Male.	Female.	Male.	Female.	
In hospital July 1, 1908	2	1	52	76	131
Admissions	104	19	956	1,267	2,346
Births	1	1	126	116	244
Total under care	107	21	1,134	1,459	2,721
Died					261
Discharged:					
Recovered					1,288
Improved					915
Unimproved					121
Not treated					7
Total died and discharged					2,592
In hospital July 1, 1909					129
Operations	61	12	435	369	877
Results of operations:					
Recovered					793
Improved					52
Unimproved					5
Died					27
Emergencies	157	18	587	200	961

Summary—Continued.

	White.		Colored.		Total.
	Male.	Female.	Male.	Female.	
Day's maintenance furnished District patients					37,326
Day's maintenance furnished United States patients					20,793
Total day's maintenance					58,119
Largest number of patients at any one time					193
Smallest number of patients at any one time					98
Daily average number of patients					154
District patients admitted					1,836
Nonresidents admitted					885
Number treated in out-patient department:					
Medical	16	1	682	758	1,457
Surgical	1	1	226	72	300
Ear, nose, and throat	2		230	247	479
Eye	3		141	169	313
Gynecological				192	192
Nervous	3		54	77	134
Skin	4		158	96	258
Genito-urinary	11		213	1	225
Total	40	2	1,704	1,612	3,358

A glance at the foregoing statistics will show the wealth of clinical material this institution affords, all of which is made available to the medical students of Howard University under fixed responsibility, as provided by the regulations receiving your approval May 3, 1909. This is very desirable, for while the Freedmen's Hospital and the Howard University are separate and distinct institutions, they are closely related in the fundamental object of their existence—advancement of the interests of the colored race.

A pressing need is a building to house the nurses. At present they occupy the ward originally intended for children, and this being the only hospital in the city receiving colored children under 18 months of age and the alarming death rate among them makes this need extremely urgent.

A receiving ward, where all patients seeking admission could be examined and classified before admission to the hospital proper, would add much to the efficiency of the institution.

Grading and fencing the grounds are among the needs that should receive early attention.

An underground passageway from the hospital to the morgue would permit the removal of bodies without exposure.

The demand for admission to the hospital from those who are able and willing to pay for medical and surgical services has been large. From this source a considerable sum could be realized which could be used in support of the hospital with good results. It is therefore earnestly recommended that steps be taken to secure such legal sanction necessary for this purpose.

Heating the buildings of Howard University by the hospital plant began November 12, 1908, and continued until May 3, 1909. Some difficulty was experienced, due in my opinion to a lack of proper supervision. Better results can be had if both systems are placed under the supervision of the engineer of the hospital. Efforts in this direction have not been successfully concluded. In the near future three more buildings will require heating, two of the university (library and

science hall) and one of the hospital, the new wing authorized at the last session by Congress, thus requiring more coal. An increase in the estimates for this purpose has been submitted to the department in the usual way.

Account with the Board of Charities from July 1, 1905, to June 30, 1909.

Fiscal year ended—	Adults.	Children.	Babies.	Total.	Bills rendered.	Payment received.	Balance due.
1906	1,675	96	165	1,936	$38,223.75	$25,500	$12,723.75
1907	1,809	119	167	2,095	36,184.80	25,500	10,684.80
1908	1,661	119	184	1,964	34,470.55	25,500	8,970.55
1909	1,566	89	181	1,836	38,846.40	25,500	13,346.40
Total	6,711	423	697	7,831	147,725.50	102,000	45,725.50

Receipts and expenditures for the year.

Receipts:		
Appropriation, sundry civil bill—		
For support	$15,000.00	
Salaries	18,500.00	
Appropriation, District of Columbia—		
Appropriation bill (under contract with Board of Charities)	25,500.00	
		$59,000.00
Expenditures:		
Miscellaneous (fuel, light, clothing, forage, medicines, etc.)	20,788.30	
Subsistence	18,730.15	
Salaries	18,401.30	
		57,919.75

TRAINING SCHOOL FOR NURSES.

The commencement exercises were held May 20, 1909, at which time 14 nurses graduated, they having passed, satisfactorily, examinations in the various subjects constituting the course of study.

The course of lectures was delivered by the following staff:

W. A. Warfield, M. D.....Gynecology	H. W. Freeman, M. D.....Anatomy
S. L. Carson, M. D.....Urinalysis	N. R. Jenner, M. D.....Obstetrics
Miss Duffy.....	Jno. R. Francis, M. D.....
Practical and theoretical nursing	Diseases of children
Wm. A. Jack, jr., M. D.....Surgery	M. O. Dumas, M. D.....
C. A. Tignor, M. D.....Physiology	Diseases of eye and ear
Jno. W. Mitchell, M. D..Materia Medica	W. W. Alleger, M. D.....Bacteriology

Applications, resignations, dismissals, etc.

Applications received	122	Dismissed	2
Applicants taken on probation	31	Resigned	5
Accepted	24	Graduated	14

Graduates of 1909.

Irene P. Allen.	Lillian A. Johnson.
Sarah L. Burnett.	Charlotte M. Lewis.
Nana E. Coats.	Mary E. Parker.
Minnie M. Curtis.	Emma D. Sheppard.
Lillian C. Green.	Annie M. Smith.
Anita B. Hall.	Emma L. Spears.
Areatha B. Hankle.	Melinda E. Wainwright.

Occupation and residence of graduates.

1896.

Ashton, Luci V., private nurse, Kansas City, Mo.
Blackburn, N. L., private nurse, Philadelphia, Pa.
Burke, Julia (Mrs. Phillips), Jacksonville, Fla.
Fleetwood, Sara I., deceased.
Foust, Isabella L., private nurse, Winston, N. C.
Gibson, Katherine C., Bureau of Engraving and Printing, Washington, D. C.
Green, Anna N., deceased.
Owens, Laura A., private nurse, Washington, D. C.
Pierce, Letitia (Mrs. Blair), Kansas City, Mo.
Ricks, Antoinette M. (Mrs. Demby), Kansas City, Mo.
Robinson, Annie B., superintendent and matron, Good Samaritan Hospital, Charlotte, N. C.
Shorter, Sarah A., private nurse, Washington, D. C.
Simms, Annie A. (Mrs. Johnson), Baltimore, Md.
Smith, Gertrude (Mrs. Thorn), Washington, D. C.
Tyler, Elizabeth, private nurse, Northampton, Mass.

1897.

Caldwell, Amanda J. (Mrs. Darrell), Dallas, Tex.
Combs, Annie, massage specialist, Washington, D. C.
Green, Lucille (Mrs. Tibbs), St. Paul, Minn.
Griffin, G. Josephine, private nurse, Washington, D. C.
Haithcock, Ada, private nurse, Washington, D. C.
King, Annie C. (Mrs. Hughes), Richmond, Va.
Rollins, Willie M. (Mrs. Frazier), Washington, D. C.
Smith, S. May, private nurse, Troy, N. Y.
Thomas, Annie M., private nurse, Washington, D. C.
Thompson, Della R. (Mrs. Davis), Vienna, Va.
Underhill, Katherine P. (Mrs. Wm. Moten), Washington, D. C.
Webb, Eva, private nurse, Washington, D. C.
Warner, Florence A., private nurse, Springfield, Mass.
Young, Lola E. M., private nurse, Greenville, S. C.

1898.

Bannister, Carrie J., private nurse, Washington, D. C.
Bennett, Florence R., private nurse, Baltimore, Md.

1898—Continued.

Cabannis, Martha E., head nurse, Richmond Hospital, Richmond, Va.
Carter, Edith M., private nurse, New Rochelle, N. Y.
Davis, Annie M., private nurse, Shelbyville, Tenn.
Ennis, Sarah J. (Mrs. Brooks), Washington, D. C.
Gaines, Mary R., private nurse, Oakland, Cal.
Geder, Isabella, private nurse, Binghamton, N. Y.
Hurlong, Mary A., private nurse, Asheville, N. C.
King, Carrie M. (Mrs. Foreman), Buffalo, N. Y.
Robinson, Amelia A., private nurse, Nashville, Tenn.
Russell, Ruby E., private nurse, Charlottesville, Va.
Stanton, Priscilla (Mrs. Todd), Pittsburg, Pa.
Sumby, Lillie May, private nurse, Washington, D. C.
Valentine, J. Ella, private nurse, Lebanon, Ind.
Whitson, Clara E. (Mrs. Howe), Washington, D. C.

1899.

Banks, Effie P. (Mrs. Sykes), Indianapolis, Ind.
Brown, Agnes M., private nurse, Meyersdale, Pa.
Coleman, Georgia A., private nurse, Washington, D. C.
Dismond, S. Matthew (Mrs. Dibble), St. Louis, Mo.
Francies, Bertha A., head nurse, Home Hospital, Birmingham, Ala.
Hairston, Lula C. (Mrs. Crews), Winston, N. C.
Hankins, Mintha C., private nurse, Washington, D. C.
Hendricks, Eliza R. (Mrs. Brown).
Henry, Lillian M., private nurse, Downingtown, Pa.
Hoge, Carrie M., private nurse, Washington, D. C.
Keemer, Jessie E. (Mrs. Robinson), Providence, R. I.
McEwen, Irene O. (Mrs. Green), Pensacola, Fla.
Rich, Anna, private nurse, Hartford, Conn.
Scott, Helen V. (Mrs. Cole), Swansboro, Ga.
Thompson, Isabella, private nurse, New Orleans, La.
Wilson, Emma C., private nurse, Montgomery, Ala.
Williams, Almira E., deceased.

Occupation and residence of graduates—Continued.

1900.

Clarke, Mary F., private nurse, Richmond, Va.
Hamilton, Priscilla, deceased.
Hawkins, Nannie E., private nurse, Charlotte, N. C.
Hunton, Mary A. (Mrs. Gordon), St. Louis, Mo.
Johnson, Hattie B., private nurse, Mount Pleasant, N. C.
Lewis, Eva P., private nurse, Manassas, Va.
Mickens, Macella C., private nurse, Pittsburg, Pa.
Middleton, Haga H., private nurse, Charleston, S. C.
Moody, Annie L., private nurse, Washington, D. C.
Smith, Cora V., private nurse, Camden, N. J.
Winfield, Laura, private nurse, Ware, Mass.

1901.

Allen, Margaret A., private nurse, Washington, D. C.
Barks, Susan C., private nurse, Washington, D. C.
Campbell, B. N., private nurse, Montgomery, Ala.
Dey, Mary L., private nurse, Philadelphia, Pa.
Hackley, Mamie E. (Mrs. Ash), Philadelphia, Pa.
Hanson, Carrie L., private nurse, Baltimore, Md.
Harrell, Catherine S. (Mrs. Butler), Texas.
Hunter, Bessie, private nurse, Washington, D. C.
Jackson, Eliza A., private nurse, Richmond, Va.
Jones, Mary J., private nurse, Washington, D. C.
Powell, Gussie D., private nurse, Richmond, Va.
Rhone, Charlotte S., private nurse, Newbern, N. C.
Robinson, Frances A., private nurse, Newbern, N. C.
Thomas, Bertha J., private nurse, Washington, D. C.
Walcott, Louisa M., private nurse, Rockhill, S. C.
Whitley, Florence A., private nurse, Newbern, N. C.

1902.

Adams, Ella C., private nurse, Philadelphia, Pa.
Baker, Vera L., head nurse, State Hospital, Goldsboro, N. C.
Booth, Mary S., private nurse, Bath, Me.
Delisse, Augusta V., private nurse, Brooklyn, N. Y.

1902—Continued.

Dias, Frances C., private nurse, Philadelphia, Pa.
Johnson, Gertrude B., private nurse, Niagara Falls, N. Y.
Mason, Corinna (Mrs. Phillips), Springfield, Mass.
Nichols, Florence L., private nurse, Newark, N. J.
Rogers, Amanda, private nurse, Indianapolis, Ind.
Roper, Maggie A., private nurse, Galveston, Tex.
Thompson, Rachel A. (Mrs. Thomas), deceased.

1903.

Browne, E. M., head nurse, Douglass Hospital, Philadelphia, Pa.
Baltimore, Mary E., private nurse, Harrisburg, Pa.
Christie, Sarah E., private nurse, Chester, Pa.
Coates, Maiella E., private nurse, Washington, D. C.
Hargrave, L. S., private nurse, Trenton, N. J.
Johnson, L. D., private nurse, Warrenton, N. C.
Johnson, Nellie V., private nurse, Abbeville, S. C.
Latney, Carrie L. (Mrs. Bowie), Washington, D. C.
Love, Ellen V., private nurse, Lumberton, N. C.
Purcell, E. J., private nurse, Brunswick, Ga.
Rollins, Clara A., private nurse, Washington, D. C.
Rutherford, Anna L., private nurse, Kingston, N. C.
Sharp, Carrie M., private nurse, Marion, Va.
Valentine, J. L. (Mrs. Dial), Jacksonville, Fla.
Yarborough, S. V. S., private nurse, Columbus, Ga.

1904.

Baker, Hattie E., private nurse, Darlington, S. C.
Blackwell, W. Lucille (Mrs. Morris), New York, N. Y.
Carter, Mary E., private nurse, Rippon, W. Va.
Carter, Elizabeth V., head nurse, Mercy Hospital, Philadelphia, Pa.
Grant, Anna E., private nurse, Savannah, Ga.
Gilmore, Mary E., private nurse, Leavenworth, Kans.
James, Aleathia D., private nurse, Rochelle, Fla.

Occupation and residence of graduates—Continued.

1904—Continued.

Jeffries, Emma M., private nurse, Redbank, N. J.
Jones, Violet, private nurse, Hartford, Conn.
Lewis, Louzetta (Mrs. Mitchell), Montgomery, Ala.
Richardson, Effie V. (Mrs. McCoy), Washington, D. C.
Thomas, Marie E. (Mrs. Jones), Topeka, Kans.

1905.

Braxton, Margaret, private nurse, Hartford, Conn.
Brooks, Alpha E., private nurse, Institute, W. Va.
Carter, Marion M., private nurse, Washington, D. C.
Henderson, Hattie E., private nurse, Cleveland, Ohio.
Holmes, Julia E., private nurse, Plainfield, N. J.
Jefferson, Roxanna M., private nurse, Bristol, Tenn.
Kidd, Bertha M. (Mrs. Harris), Washington, D. C.
Long, Ida E., private nurse, Newark, N. J.
Maston, Mary J., head nurse, Red Cross Sanitarium, Louisville, Ky.
Scott, Julia E., private nurse, New Haven, Conn.
Teabout, Stella, private nurse, Richfield Springs, N. Y.
Taliaferro, Olivia, private nurse, Anacostia, D. C.
Terry, Jessie C., private nurse, Los Angeles, Cal.
Williams, Daisy M. (Mrs. Moten), Sherman, Tex.
Williams, Mary T., private nurse, Ware Neck, Va.
Wilson, Annabel, private nurse, Baltimore, Md.

1906.

Barnes, Annie, private nurse, Baltimore, Md.
Bearce, Daisy M., private nurse, Rye, N. Y.
Burruss, Mary E. (Mrs. Wormley), Jersey City, N. J.
Gordon, Mary B., private nurse, Washington, D. C.
Hall, Iona M., private nurse, Troy, Ohio.
Henderson, Sara O., private nurse, Newport, R. I.
Johnson, Harriett C., private nurse, Cleveland, Ohio.
Lewis, Willie A., private nurse, Atlanta, Ga.

1906—Continued.

Lucas, Marion V., head nurse, Freedmen's Hospital, Washington, D. C.
McDougal, Colota M., private nurse, Indianapolis, Ind.
McKnight, Viola, superintendent of nurses, Mercy Hospital Philadelphia, Pa.
Marshall, Mary E., private nurse, Morristown, Tenn.
Merritt, Mary E., superintendent of nurses, Mitchell Hospital, Leavenworth, Kans.

1907.

Bullock, Blanche V., private nurse, Richmond, Va.
Childs, Helen D., private nurse, Lakewood, N. J.
Escoffery, Lula M., private nurse, Atlantic City, N. J.
Harmon, Nannie M., private nurse, Tip Top, Va.
Porter, Susan H., private nurse, dean woman's department, Tuskegee, Ala.
Payton, Lillian M., private nurse, Washington, D. C.
Peck, Alice M., private nurse, Baltimore, Md.
Rose, Julia M., private nurse, Lynchburg, Va.
Slocum, Mary E., private nurse, Providence, R. I.
Smith, Minnie M., private nurse, Amherst, Mass.
Taylor, Loretta P., private nurse, Washington, D. C.
Wright, Nena J., private nurse, Washington, D. C.

1908.

Briggs, Cornelia K., head nurse, Freedmen's Hospital, Washington, D. C.
Denning, Clara S., private nurse, Canajoharie, N. Y.
Douglass, Kate E., private nurse, New Bedford, Mass.
Donaldson, Vesta L., private nurse, Ocean Grove, N. J.
Fray, Julia, private nurse, Washington, D. C.
Henderson, Jamima S., private nurse, Spring Lake, N. J.
Jones, Bertie L., private nurse, Harrisburg, Pa.
Nicholas, Beatrice E., private nurse, Baltimore, Md.
Proctor, Eva M., private nurse, Newark, N. J.
Robinson, Alice E., private nurse, Hartsville, S. C.
Reynolds, Agnes, private nurse, Ironton Ohio.

The circular of information sent to applicants is reprinted below:

The Freedmen's Hospital Training School for Nurses is established to give a two years' course of training to women who desire to enter the profession of nursing.

Applicants may be received at any time during the year when there is a vacancy. Those wishing to obtain this course of instruction must apply to the surgeon in chief of the Freedmen's Hospital, and printed instructions will be furnished respecting the personal information to be given by applicants. Letters of application should be accompanied by a statement from a clergyman, testifying to good moral character, and from a physician, certifying to sound health and unimpaired faculties. Applicants must be between 21 and 35 years of age, of at least average height and physique, and must give satisfactory evidence of a general fitness of disposition and temperament for the work of nursing. It has been the practice of the hospital to appoint only unmarried colored women (this term includes widows). Upon the recommendation of the superintendent of the nurses and the approval of the surgeon in chief they will be received one month on probation. During the month of trial and previous to being accepted as a pupil in the school the applicant must be prepared for an examination in reading, penmanship, simple arithmetic, and English dictation. The examination is to test the applicant's ability to read aloud well, to write legibly and accurately, to understand arithmetic as far as fractions and per cent, and take notes of lectures. This amount of education is indispensable for a member of the school, but applicants are reminded that women of superior education and cultivation will be preferred.

During the probationary month, board, lodging, and laundry work are provided by the school. The probationer provides her own dress.

The training school authorities reserve the right to terminate the connection of a pupil with the school at any time in case of misconduct, inefficiency, or neglect of duty. Those who prove satisfactory are accepted as pupils after signing a written agreement to remain at the school for two years, including the probationary month, and during that time to obey the rules of the school and hospital and to be subordinate to the authorities governing the same. Pupils reside at the home and serve as assistants in various departments of the hospital for the full two years. They are also expected to perform any duty assigned to them by the superintendent of nurses.

After the month of probation pupils are required, when on duty, to wear the dress prescribed by the hospital, which is a blue gingham, simply made, with white apron and cap and linen collar and cuffs. Probationers are not allowed to wear this dress.

In addition to their board and lodging and a reasonable amount of laundry work, the nurses will be provided with uniforms, the necessary note and text-books, also $5 per month. This sum is not given as pay for services rendered, it being considered that their education during that time is a full equivalent for their services.

The day nurses are on duty from 7.30 a. m. to 7.30 p. m., with an hour off for dinner and additional time for exercise or rest. The pupils have a right to one-half of Sunday and are often given a half day in the week. A vacation of two weeks is allowed each year during the summer. In sickness the pupils are cared for gratuitously, but the time lost must be made up.

The course of instruction is given by visiting and resident physicians and surgeons at the bedside of the patients and by the superintendent and head nurse. A regular course of lectures, recitations, and demonstrations is also given, with examinations at stated periods. When the full term of two years is ended, the nurses receive, if they pass the examination and are otherwise satisfactory, a diploma certifying to the course of training and practice.

COURSE OF TRAINING.

The instruction includes:

(1) The dressing of blisters, burns, sores, wounds; the application of fomentations, poultices, cups.

(2) The administration of enemas and use of catheter.

(3) The management of appliances for uterine complaints.

(4) The best method of friction to the body and extremities.

(5) The management of helpless patients; making beds, moving, changing, giving baths in bed, preventing and dressing bedsores, and managing positions.

(6) Bandaging, making bandages and rollers, lining of splints.

(7) The preparing, cooking, and serving of delicacies for the sick.

They will also be given instruction in the best practical methods of supplying fresh air, warming and ventilating sick rooms in the proper manner, and are taught to take care of rooms and wards, to keep all utensils perfectly clean and disinfected,

to make accurate observations and reports to the physician of the state of the secretions, expectoration, pulse, skin, appetite, temperature of the body, intelligence as to delirium or stupor, breathing, sleep, condition of wounds, eruptions, formation of matter, effect of diet, or of stimulants, or of medicine, and to learn the management of convalescents.

The teaching will be given by visiting or resident physicians and surgeons at the bedside of the patients, and by the superintendent. Lectures, recitations, and demonstrations will take place from time to time, and examinations at stated periods.

When the full term of two years is ended, the nurses thus trained, on passing a satisfactory examination, each receive a diploma.

QUESTIONS TO BE ANSWERED BY CANDIDATES.

(1) Name in full.
(2) Are you a single woman or widow?
(3) If a widow, have you children; how many; their ages; how are they provided for?
(4) Are you otherwise free from domestic responsibility so that you are not liable to be called away during the two years' course?
(5) Your present occupation or employment.
(6) Your former employment, if any.
(7) Your age on last birthday.
(8) Date and place of birth.
(9) Height.
(10) Weight.
(11) In what schools and places were you educated? And state what your advantages have been.
(12) Have you ever been in any other hospital or training school?
(13) Are you strong and healthy, and have you always been so?
(14) Are your sight and hearing good?
(15) Have you any physical defects?
(16) Have you any tendency to pulmonary complaint?
(17) Have you ever had any uterine disease?
(18) The names in full of two persons to be referred to, not relatives; and state how long each has known you; if previously employed, one of these must be the last employer.
(19) Have you read and do you clearly understand the regulations?

CONTRACT SIGNED BY PUPIL NURSES ON ENTERING THE SCHOOL.

WASHINGTON, D. C., ———, 190—.

I, ——— ———, the undersigned, do hereby agree to remain two years from date a pupil of the above-named institution, and promise during that time to obey the rules of school and hospital and to be subordinate to the authorities governing the same.

Very respectfully,

W. A. WARFIELD,
Surgeon in Chief.

The SECRETARY OF THE INTERIOR.

REPORT OF THE PRESIDENT OF HOWARD UNIVERSITY.

ROSTER OF OFFICERS.

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Term expires 1911.

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Term expires 1912.

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HEADS OF DEPARTMENTS.

The College of Arts and Sciences: KELLY MILLER, A. M., *Dean.*
The Teachers' College: LEWIS B. MOORE, A. M., Ph. D., *Dean.*
The School of Theology: ISAAC CLARK, A. M., D. D., *Dean.*
The School of Medicine: EDWARD A. BALLOCK, A. M., M. D., *Dean.*
The School of Law: BENJAMIN F. LEIGHTON, LL. D., *Dean.*
The Commercial College: GEORGE W. COOK, A. M., LL. M., *Dean.*
The Academy: GEORGE J. CUMMINGS, A. M., *Dean.*
The School of Manual Arts and Applied Sciences: WALTER S. GRAFFAM B. S. *Director.*

REPORT OF THE PRESIDENT OF HOWARD UNIVERSITY.

HOWARD UNIVERSITY,
Washington, D. C., July 15, 1909.

SIR: I have the honor to submit for Howard University the following report, showing "the condition of the institution on the 1st day of July, embracing therein the number of pupils received and discharged or leaving the same for any cause during the year and the number remaining; also the branches of knowledge and industry taught, and the progress made therein." The report of the treasurer attached shows "the receipts of the institution and from what sources, and its disbursements and for what objects."

The students, 1,205 in number, were from 35 States and Territories; from Porto Rico 7, and from the following foreign countries: Africa, 5; British West Indies, 80; Cuba, 5; Republic of Panama, 2; South America, 10, and from Santo Domingo, Haiti, and India, each 1.

Of these, 142 graduated as per statement under each department.

Howard University was founded in 1867 under the Freedmen's Bureau. The original farm purchased for the site, together with the buildings, is now surrounded by the city, and the grounds and buildings of the university are valued at over $1,000,000. The university has sent out over 2,500 graduates from the several departments, who have made an honorable record for usefulness and large service among their people. The enrollment for the current year is 1,205 students. The national character of the institution may be judged from the fact that these students come from 35 States and 112 from 9 foreign countries. Howard University is the only institution where the nation directly touches the education of the negro. While millions of dollars have been appropriated for the education of Indians and the Eskimos of Alaska, the appropriations to this university have been comparatively small, although it has to do with the uplifting of ten millions of negroes on whom have been placed the duties and responsibilities of citizenship. While some state institutions for negroes are maintained in the South, yet the appropriations for the same are generally limited, and mostly from the Morrill fund. Hence the importance of this institution that provides for the training of the teachers, physicians, the intellectual and moral and industrial leaders and helpers of a race.

For convenience I render a detailed report by departments.

SCHOOL OF MEDICINE.

The school of medicine was chartered by act of Congress March 2, 1867. It includes the medical, dental, and pharmaceutic colleges, and, in conformity with the spirit of the organic law of the university, is open to all persons without regard to sex or race who are qualified by good moral character, age, and required preparation. The courses

have been lengthened to four years and the sessions now extend from October 1 to June. The courses of study cover the following subjects: Anatomy, physiology, histology, materia medica, therapeutics, electro-therapeutics, general chemistry, organic chemistry, toxicology, obstetrics, embryology, practice of medicine, surgery, minor surgery, hygiene, pathology, bacteriology, gynecology, pediatrics, ophthalmology, otology, dermatology, laryngology, rhinology, physical diagnosis, and medical jurisprudence. The curriculum in the dental college comprises anatomy, physiology, histology, materia medica, threapeutics, chemistry, toxicology, metallurgy, oral surgery, operative and prosthetic dentistry, dental technic, pathology, bacteriology, hygiene, and medical jurisprudence. The curriculum in pharmacy comprises chemistry, toxicology, botany, materia medica, therapeutics, pharmacy, microscopy, bacteriology, urinalysis, and physiology.

The completion of the new Freedmen's Hospital, which is built on an adjoining park of 11 acres, ceded to the Government by the university for this purpose, will give to the school of medicine exceptionally fine clinical advantages.

Students in attendance in the school of medicine.

Seniors	37	Senior pharmaceutic	19
Juniors	53	Middle year pharmaceutic	17
Sophomores	52	First year pharmaceutic	29
Freshmen	63	Special students	42
Senior dental	20	Post graduates	8
Middle dental	24		
First year dental	45	Total	409

Of these, 26 received the degree of M. D., 19 received the degree of D. D. S., and 13 received the degree of Phar. D.

SCHOOL OF LAW.

The branches taught are the same as those of other law schools in the city of Washington, as follows:

FIRST YEAR.

Blackstone's Commentaries; Tiedeman on Real Property, as far as the chapter on Trusts; Darlington's Personal Property; Lawson on Contracts, enlarged edition; Daniel and Douglass's Elements of the Law of Negotiable Instruments; American Cases on Contracts, by Huffcutt and Woodruff, and Schouler on Domestic Relations; Hale on Torts; Clark on Criminal Law.

MIDDLE YEAR.

Andrew Stephen's Pleading; Adams on Equity; Shepard's Selected Cases in Equity; Clark's Criminal Procedure; Greenleaf's Evidence, volume 1; Tiedeman on Real Property, commencing with the chapter on Trusts; Wambaugh's Study of Cases.

SENIOR YEAR.

Cooley's Principles of Constitutional Law; Boyd's Constitutional Law Cases; Bateman's Mercantile Law; Clark on Corporations; Burdick on Partnerships; Burdick on Sales; Elliott on Insurance; Greenleaf on Evidence, volumes 2 and 3; Schouler's Executors and Administrators; Woolsey on International Law.

Students in attendance in the school of law.

Seniors	19
Middlers	23
Juniors	49
Specials	9
Total	100

Of these, 18 received the degree of bachelor of laws.

SCHOOL OF THEOLOGY.

The school of theology, which is not supported in any degree by Congress, requires no doctrinal tests, is interdenominational, and welcomes the patronage of all who are preparing for moral and religious work, makes the following report:

The branches taught are the Scriptures in the original, the English Bible, bibical history and antiquities, systematic theology, church history, homiletics, Christian missions, pastoral theology, moral philosophy, natural theology, evidences of Christianity, elocution, rhetoric, and vocal music.

There are three courses—a classical and an English day course and a night English course. Only those in the classical course study the Scriptures in the original.

Various denominations are represented among the teachers and students, and all work in harmony. Three teachers give all their time to the work, and two part time.

Students in attendance in the school of theology.

Seniors	4
Middlers	12
Juniors	15
Specials	8
Unclassified	8
	47
Evening institute:	
Fourth year	10
Third year	8
Second year	14
First year	18
	50
Total	97

Of these, 1 received the degree of bachelor of divinity, 4 received diplomas, and 7 received testimonials.

COLLEGE OF ARTS AND SCIENCES.

The students are classified, as in other American colleges, into seniors, juniors, sophomores, and freshmen.

The subjects taught are as follows: Algebra, geometry, trigonometry, analytics, calculus, astronomy, physics, chemistry, geology, zoology, botany, mineralogy, biology, logic, rhetoric, history, English literature, Greek, Latin, French, German, psychology, moral philosophy, political science, international law, political economy, sociology, pedagogy, theism, modern philosophy, history of education, and Bible study. The Bible is studied as literature, and the great ethical principles that form the basis of social and moral life are enforced.

Students in attendance in the department of college of arts and sciences.

Seniors	20
Juniors	22
Sophomores	35
Freshmen	36
Special students	2
Total	115

Of these, 17 received the degree of A. B.

TEACHERS' COLLEGE.

This college is the department of pedagogy for the study of educational science and the training of teachers. The purpose of the department is to afford opportunity, both theoretical and practical, for the training of teachers of both sexes for elementary and secondary schools, and by instruction and direction to help those who desire to pursue studies and investigations in the science of education.

The work aims (1) to acquaint the students with those principles and practices of education which have changed the methods of secular schools and established them upon a psychological basis; (2) to lay broad culture in the student himself, and (3) to create a spirit of enthusiastic devotion to the highest of all work—the instruction of a little child.

The practice school is the laboratory of the department. Members of the senior class give instruction here one year as a part of their required training.

The following subjects are taught: Teachers' course in English, physiology, zoology, physiography, physics, nature study, history, gymnastics, Bible, elocution, psychology (elementary and descriptive), history of pedagogy, history of philosophy, ethics, philosophy of education, methods of teaching, and kindergarten methods.

The junior class has enjoyed a course in general culture, including reviews of popular works and discussions of current topics.

Students in attendance in the teachers' college.

Seniors	22
Juniors	3
Sophomores	5
Freshmen and first year	15
Special students	30
Elementary school	37
Total	112

Of these, 3 received the degree of A. B., 3 received the degree of Pd. B., and 12 received diplomas of graduation.

DEPARTMENT OF MANUAL ARTS.

The department of manual arts is closely affiliated with the teachers' college and the academy in order to serve the double purpose of giving instruction in the manual arts, and also of training teachers competent to teach manual training in the graded and secondary schools. The demand for teachers who can give instruction in manual training in addition to an academic subject is frequent and urgent, and the trustees felt that by a proper correlation of the industrial and

academic work they could make this department of the university of much more value to the people whom Howard University must elevate.

The subjects taught are free-hand and mechanical drawing, woodwork, sheet-metal work, printing, sewing, weaving, basketry, garment making, millinery, and cookery.

The courses are open to all departments of the university and enrolled students, as follows:

Printing	9
Domestic arts	50
Woodwork	44
Drawing	74
Domestic science	43
Forging	7
Total	227

COMMERCIAL COLLEGE.

This department gives a business course and English high-school education combined. It offers courses in bookkeeping, commercial law, history, civics, etc. Special emphasis is placed on reading and spelling, grammar, and arithmetic, as will appear below. The fourth-year class is the highest in the grade of study. The department maintains special classes in typewriting, shorthand, and English grammar. All students in the first-year class are required to spend four hours a week in the industrial department. The instruction is designed to fit pupils for intelligent citizenship and practical business.

The following branches are taught in the various classes: Higher English, mathematics, stenography and typewriting, physics, bookkeeping, political economy, civics, commercial law, commercial geography, sociology, zoology, physiology, statistics, and history of commerce.

Students in attendance in the commercial college.

First-year class	6
Second-year class	29
Third-year class	13
Fourth-year class	9
Special students	30
Total	87

Of these, 4 received diplomas.

ACADEMY (PREPARATORY DEPARTMENT).

The academy furnishes a broad and thorough preparatory course, fitting for the college, such as is offered in the best academies of the country. The course covers four years of study.

In the senior year the following subjects are offered: The English classics, mathematics, Latin, Greek, German or French, the Bible as literature, essays, and discussions during the year.

In the middle year the following subjects are taught: Physics, chemistry, algebra, English classics, essays, Latin, Greek, French or German.

In the submiddle class the subjects taught are: English history, English classics, physical geography, geometry, French or German, the Bible, and manual training, such as carpentry, printing, etc.

In the junior year the subjects taught are: English composition, elementary rhetoric, ancient history, introductory Latin, the Bible, music, drawing, physiology, and manual training four hours a week.

Students in attendance in academy.

Seniors	27
Middlers	47
Submiddlers	75
Juniors	164
Special students	10
Total	323

Of these, 22 received certificates of graduation.

Respectfully submitted.

WILBUR P. THIRKIELD, *President.*

The SECRETARY OF THE INTERIOR.

REPORT OF TREASURER.

The appropriation bill requires the proper officer of the university to report how the appropriation is expended, and in compliance with this requirement I have the honor to add the following statement:

Expenditure of appropriation.

General officers:		
President	$3,960.00	
Secretary and treasurer, 4 months, at $210 per month	840.00	
Librarian	594.00	
Preceptress and instructor in English	1,080.00	
Matron	200.00	
		$6,674.00
College of arts and sciences:		
Dean and professor of mathematics	1,760.00	
One assistant professor of physics and chemistry	1,100.00	
One professor of biology and geology	1,650.00	
One professor of Greek and ethics	500.00	
One professor of history	1,650.00	
One professor of English literature	1,650.00	
One professor of Latin	1,500.00	
One instructor in English, French, and German	1,237.50	
One professor of social science	1,650.00	
		12,697.50
Teachers' college:		
Dean and professor of pedagogy	1,944.00	
One instructor in mathematics and science	1,350.00	
One instructor in methods, pedagogy, and nature study	1,350.00	
One director of training school	990.00	
One instructor in English language and literature	765.00	
One instructor in history and civics	643.50	
One instructor in arithmetic and geography	585.00	
One director in kindergarten training department	880.00	
One director of music	810.00	
One assistant in music	315.00	
		9,632.50
Academy:		
One dean and professor of Latin and Greek	1,584.00	
One professor of history and mathematics	990.00	
One instructor in English, rhetoric, and history	990.00	
One instructor in modern languages	495.00	
One instructor in Latin and Greek	540.00	
One instructor in physics and chemistry	540.00	
		5,139.00
Commercial college:		
One dean and professor of civics and commercial law	1,584.00	
One instructor in shorthand and typewriting	660.00	
One instructor in bookkeeping and commercial geography	693.00	
One instructor in history	720.00	
		3,657.00
The school of law:		
One dean, lecturer on the law of contracts, constitutional and statutory law	1,500.00	
One lecturer on pleading and practice	1,500.00	
One lecturer on torts, crimes, etc	1,500.00	
One lecturer on evidence, personal property, etc. (also librarian)	1,400.00	

The school of law—Continued.		
One lecturer on domestic relations, commercial paper, etc	$500.00	
One lecturer on commercial law, etc	500.00	
One lecturer on the law of real property	300.00	
		$7,200.00
Total for salaries under item 1, Howard University appropriation, 1909		45,000.00
The school of manual arts and applied sciences:		
Director and instructor in ironwork		1,600.00
One instructor in woodwork		1,200.00
One instructor in domestic arts		1,100.00
One instructor in domestic science		1,000.00
One instructor in printing		800.00
One instructor in drawing		700.00
Tools, materials, fuel, etc		2,380.64
Tools, materials, etc., contracted and to be paid for		219.36
		9,000.00

The university has expended or has contracted for during the year $5,052.94 for improvements of grounds and repairs of buildings, of which $3,000 was appropriated by Congress. The appropriation of $1,500 for the law and general library was expended or contracted for under the direction of the library committee, about $350 going to the law department library and the balance going to the general library. The books were purchased from the lowest bidders in each case. The bids were all submitted to the Secretary of the Interior and the purchases made by his authority. The sum of $200 appropriated for material and apparatus for chemical, physical, and natural-history studies, and use in laboratories, including cases and shelving, was used by the professors of chemistry, physics, and natural history after submission of proposals to the Secretary of the Interior. The sum of $4,888.97 was spent for fuel and lighting for the various buildings, of which $3,000 was appropriated by Congress. The sum of $3,866.18 was paid and contracted for equipment, supplies, etc., for the medical department, of which $1,500 was appropriated by Congress.

Cash receipts and disbursements July 1, 1908, to June 30, 1909.

RECEIPTS.

Balance on hand July 1, 1908		$9,294.46
From government appropriation		63,081.94
From endowment:		
General	$12,156.61	
Theological	2,800.00	
Special and scholarships	1,844.71	
		16,801.32
From medical students, tuition	24,709.16	
From academic students, fees, room rent, board, etc	19,613.22	
From law students, tuition	1,842.98	
		46,165.36
From donations		1,432.25
From Mr. Andrew Carnegie for library building		3,500.00
From land other than plant sold		3,748.69
From endowment invested (principal paid)		9,400.00
From bills payable		3,000.00
From library building fund		547.00
From gymnasium building fund		76.00
From unrestricted funds		225.00
From miscellaneous		3,700.50
Total receipts		160,972.52

DISBURSEMENTS.

To general expense account:		
Salaries	$8,728.92	
Heat, light, and water	555.35	
Telephone, telegraph, and stationery	599.77	
Travel, expenses, and advertising	508.10	
Catalogues and reports	905.74	
Miscellaneous expenses	908.62	
		$12,206.50
To maintenance account:		
Salaries	3,269.74	
Grounds	792.39	
Repairs and buildings	3,959.32	
Miscellaneous	264.08	
		8,285.53
To academic account:		
Salaries	33,422.85	
Supplies	262.79	
Laboratories	385.03	
Heat, light, and water	664.57	
Library and reading room	1,039.35	
Music	1,111.13	
Miscellaneous	1,302.70	
		38,188.42
To manual arts department:		
Salaries	6,400.00	
Woodworking, etc	1,424.91	
Printing office	714.94	
Domestic science	224.86	
Domestic arts	213.35	
General expenses	422.49	
		9,400.55
To boarding hall account:		
Food supplies	8,674.31	
Salaries	701.03	
Heat, light, and water	289.63	
Miscellaneous supplies	378.43	
		10,043.40
To room rent account:		
Salaries and help	1,393.15	
Repairs and renewals	684.44	
Heat, light, and water	1,591.05	
		3,668.64
To school of medicine account:		
Salaries of professors	17,870.66	
Administration salaries	1,920.00	
Laboratory supplies	3,756.07	
Heat, light, and water	1,670.12	
Repairs and renewals	925.10	
Janitors	950.00	
Miscellaneous	691.33	
		27,783.28
To school of law accounts:		
Salaries of professors	7,200.00	
Administration salaries	347.50	
Library	334.14	
Heat, light, and water	133.96	
Miscellaneous	176.52	
		8,192.12
To school of theology:		
Salaries	3,408.00	
Miscellaneous	74.90	
		3,482.90

DISBURSEMENTS—continued.

To student labor (miscellaneous)	$1,763.91	
Accounts payable	8,678.06	
Architect and contractor, Carnegie Library	3,487.75	
Land other than plant	761.29	
Endowment and other funds invested	13,282.55	
Miscellaneous	5,620.14	
		$33,593.70
Total disbursements		154,845.04
Cash on hand June 30, 1909		6,127.48
Total		160,972.52

List of permanent funds, with receipts and expenditures of income of scholarship and special funds.

	Principal.	Income.
Scholarship funds:		
Frederick Douglass fund	$4,430.50	
By interest		$221.53
J. K. McLean fund	1,000.00	
By interest		60.00
W. W. Patten fund	1,000.00	
By interest		50.00
Mary B. Patten fund	1,200.00	
By interest		60.00
F. B. Schoals fund	6,000.00	
By interest		305.00
J. P. Thompson fund	260.00	
By interest		13.00
William E. Doyle fund	5,000.00	
By interest		259.00
Horace Ford fund	1,000.00	
By interest		50.00
J. W. Alvord fund	1,000.00	
By interest		50.00
Orange Valley fund	1,000.00	
By interest		50.00
Thomas Cooper Riley fund	1,000.00	
By interest		50.00
Thaddeus Stevens fund	2,200.00	
By interest		110.00
Caroline Patten Hatch fund	200.00	
By interest		10.00
Martha Spaulding fund	7,000.00	
By interest		360.00
Pomeroy scholarship fund	2,500.00	
By interest		125.00
W. W. Patten memorial fund	12.10	
By interest		.60
Total	34,802.60	1,774.13
By balance July 1, 1909		988.85
To amount transferred to aid funds		2,762.98
Special funds:		
Edward Smith text fund	500.00	
By balance July 1, 1908		35.84
By interest		25.00
		60.84
To balance		54.84
To books for students		6.00
		60.84
Hartford reading room fund	400.00	
By balance July 1, 1908		.23
By interest		20.00
		20.23
To supplies for library		12.44
To balance June 30, 1909		7.89
		20.33

List of permanent funds, with receipts and expenditures of income of scholarship and special funds—Continued.

	Principal.	Income.
Special funds—Continued.		
School of theology alumni fund	$40.00	
By interest		$2.00
To theological students aid		2.00
Alumni professorship fund	25.00	
By balance July 1, 1908		6.90
By interest		1.25
To balance June 30, 1909		8.15
Medical aid fund	689.75	
By interest		20.83
To principal	20.83	
Medical building fund	50.00	
By interest		1.50
To principal	1.50	
Total scholarship and special funds	36,529.68	
General endowment funds	137,547.86	
Total permanent funds	[a]174,077.54	

[a] Reconciliation with figures reported June 30, 1908:

Total permanent funds, as per report 1907–8			$175,356.45
Less amount unrestricted funds, inadvertently included in list of permanent funds reported June 30, 1908		$2,040.99	
Additional medical aid fund made part of permanent funds	$710.58		
Additional medical building fund made part of permanent funds	51.50		
		762.08	
			1,278.91
			174,077.54

REPORT OF THE SUPERINTENDENT OF THE UNITED STATES CAPITOL BUILDING AND GROUNDS.

REPORT OF THE SUPERINTENDENT OF THE UNITED STATES CAPITOL BUILDING AND GROUNDS.

OFFICE OF SUPERINTENDENT,
UNITED STATES CAPITOL BUILDING AND GROUNDS,
Washington, D. C., July 1, 1909.

SIR: I have the honor to report the work of improvement and repairs at the Capitol and the other buildings under the supervision of this office during the fiscal year ended June 30, 1909.

THE CAPITOL.

The work at the Capitol has not been different from preceding years in that it has consisted of permanent improvements and repairs.

The more important among the works of a permanent character may be named—the installation of two new passenger elevators in the House of Representatives wing of the Capitol and the changes in the committee rooms in the Senate and House wings, which consisted in cutting doorways, carpenter work, plastering, electrical work, etc.

One of the rooms formerly occupied by the stationery division of the Senate was fitted up as an additional room for the Committee on Indian Affairs, and the janitor's office on the basement floor adjoining was given to the stationery division.

The room formerly occupied as an office by the captain of the Capitol police was fitted up as a room for the use of Senators' stenographers.

In the House wing the rooms formerly occupied by the Committees on Agriculture and Insular Affairs were fitted up for the Committee on Post-Office and Post-Roads and that of Post-Office and Post-Roads given to the minority members.

Because of the removal of the Ways and Means Committee to the House Office Building, the old committee room on Military Affairs being vacated was put in order for the Ways and Means as an additional room.

The Committee on Foreign Affairs now occupies the committee rooms formerly occupied by Committees on Elections Nos. 1 and 2.

The Committee on Elections No 1 has been removed from the gallery floor to the basement floor, south end of House wing, and the Committee on Reform in the Civil Service having been assigned rooms in the House Office Building, the room formerly occupied by that committee was added to that of Printing by cutting a door between the rooms.

Alterations were made in the structural work in the subbasements of both the Senate and House wings, to accommodate the new ele-

vators on the House side, and also for the approaches to the subways of both wings.

In the central portion of the Capitol, the corridor room of the Senate Committee on Census was enlarged.

The terrace rooms of the Senate and House wings, having been vacated by Senators and Members who now occupy rooms in the two new office buildings, these rooms on the Senate side have been assigned to the Superintendent of the Capitol for storerooms, janitor's rooms, and for that of repair room for works of art in the Capitol.

On the House side the rooms have been remodeled to accommodate the machinery connected with the new substation to be used in connection with the heating, lighting, and power plant now being erected for the use of the congressional buildings.

Additional steel file and case work has been installed in the Senate document and stationery rooms.

Several pairs of mahogany doors to replace those of white pine have been put up in different parts of the Capitol.

Concrete floors have been laid in the terrace rooms, and karbolith floors have been installed in the Senate document and House library rooms. New chandeliers have been put up in the marshal's office, conference room, Military Affairs of the Senate, and stationery room.

Annually a large amount of frescoing and plain painting is done in committee rooms and corridors, and the past year has been no exception, for much work of this character has been executed.

A number of necessary repairs to the roofs, plumbing, windows, kitchens, etc., have been made, while the machinery, boilers, and furnaces of the heating, lighting, and ventilating departments have been thoroughly cleaned and repaired.

The whole number of the various kinds of work executed during the year is approximately fourteen hundred.

CAPITOL GROUNDS.

The grounds have been well cared for by providing them with suitable fertilizers and sodding, and necessary pruning done to shrubbery and trees, while the lawns have had the usual attention.

The flower plantings on the terraces and about the fountains have received special care.

All necessary repairs to driveways and walks have been made, while the introduction of machine hand sweepers has contributed in no small degree in keeping the driveways in a cleanly condition.

ENGINE HOUSE, SENATE AND HOUSE STABLES.

Necessary repairs have been made to all of the roofs of these buildings; new gutters and spouts have been put up; pavements and woodwork repaired, and the necessary painting done.

COURT-HOUSE, DISTRICT OF COLUMBIA.

Under a special appropriation, a large section of new roof was put on the north side of the building.

In addition to the repairs to the plumbing throughout the building, a large amount of worn-out drainage and water pipe has been replaced by new material.

The heating plant was overhauled and necessary repairs made. Several of the rooms of the judges, the corridors, and other rooms were painted.

Considerable carpenter, brick, and electrical work was done during the year.

EXTENSION TO DISTRICT OF COLUMBIA COURT-HOUSE BUILDING FOR THE COURT OF APPEALS.

To July 1, 1909, the following work has been executed at the above-named building:

The excavations were completed and the concrete footings placed. The sewer was run for 300 feet through the grounds to the building, and the other sewers and branches were installed in the building. The brickwork was completed to and above the second floor, and the stonework completed to the second floor. All the steel beams for the first and second floors were put in place, and the concrete floors on the first story laid.

COURT OF CLAIMS BUILDING.

Under an appropriation for this building repairs to roofs, skylights, and spouting were made.

BOTANIC GARDEN.

The usual annual repairs to plant houses, heating plant, and cement walks were made, as shown by the report of the superintendent filed in this office.

Details of all the foregoing work may be found in the records of this office.

EXPENDITURES.

The expenditures for the fiscal year ended June 30, 1909, were as follows:

Expenditures for fiscal year ended June 30, 1909.

CAPITOL BUILDING AND REPAIRS.

Pay rolls	$16,416.20
Labor vouchers	1,166.88
Machinery and ironwork	3,176.56
Brushes, sponges, soap	604.27
Lumber and millwork	2,334.71
Hardware	1,399.09
Lime, brick, cement, and sand	268.68
Paint, oil, and glass	2,368.01
Marble, stone, brick, and concrete work	1,728.37
Electric wiring, etc	260.45
Drawing materials, blueprints, etc	54.87
Office vehicle	3,201.81
Hauling, expressage, telegrams, etc	74.94
Plumbing and plumbing material	3,333.40
Elevators and repairs	749.00
Roofing and tinwork	463.11
Painting and decorating	855.50
Tile and tiling	772.84
Bronze work	194.00
Plaster material	135.31

Stationery and books	$51.55
Tackle, rope, and flags	1,298.97
Traveling expenses	24.05
Heating and ventilating	1,676.15
Repairs to kitchen ranges	337.09
Miscellaneous	53.30
Reserved for unpaid bills	685.69
Total	43,684.80

Appropriated:		
Sundry civil act approved May 27, 1908	$30,000.00	
Deficiency act approved May 30, 1908	5,684.80	
Deficiency act approved March 4, 1909	8,000.00	
		43,684.80

IMPROVING THE CAPITOL GROUNDS.

Pay rolls	$16,164.44
Labor vouchers	546.00
Plants and sodding	1,289.20
Fertilizers	502.75
Tools and machinery	1,638.70
Brushes, brooms, etc	307.00
Gasoline	90.73
Brick, cement, lime, etc	135.48
Plumbing materials	19.00
Hardware	98.41
Paving and repairs	699.00
Freight and expressage	29.73
Hose and couplings	225.40
Lumber and carpenter work	261.19
Horses and carts, hire	2,829.00
Grates and frames for park	131.88
Miscellaneous items	25.25
Reserved for unpaid bills	5.78
Total	25,000.00
Amount appropriated, sundry civil act approved May 27, 1908	25,000.00

LIGHTING CAPITOL GROUNDS, ETC.

Pay rolls	$33,028.86
Labor vouchers	378.67
Incandescent and arc lamps	6,148.90
Electric wire and material	2,150.34
Fixtures	2,639.43
Iron and metal work	41.01
Hauling and expressage	5.13
Hardware	52.30
Nickel plating	17.45
Electric molding	72.00
Steam pipe and fittings	420.80
Gas and electric current	2,538.94
Electric instruments and apparatus	72.47
Grate bars	258.86
Repairs to boilers	333.71
Miscellaneous	74.32
Reserved for unpaid bills	2,666.80
Total	50,900.00

Amount appropriated:		
Sundry civil act approved May 27, 1908	$42,900.00	
Deficiency act approved March 4, 1909	8,000.00	
		50,900.00

ADDITIONAL ELEVATORS, HOUSE WING.

Pay rolls	$1,222.34
Traveling expenses	92.04
Labor vouchers	866.78
Lumber and millwork	169.87
Electrical work and material	168.56
Hauling, expressage, telegrams, etc	1.17
Brick, lime, cement, and plaster	203.15
Ironwork	1,540.61
Plumbing and material	501.20
Machinery	11,829.45
Brick and concrete work	1,721.17
Painting	97.00
Elevator inclosures	3,683.00
Unexpended balance for unpaid bills	3,903.66
Total	26,000.00
Amount appropriated, sundry civil act, approved May 27, 1908	26,000.00

SPECIAL REPAIRS SENATE DOCUMENT ROOM.

Pay rolls	$844.53
Cabolith floor	828.20
Labor vouchers	105.25
Plumbing and material	21.76
Sundries	.26
Total	1,800.00
Amount appropriated, sundry civil act approved May 27, 1908	1,800.00

REPAIRS TO COURT-HOUSE, DISTRICT OF COLUMBIA.

Repairs to heating apparatus	$224.07
Pay rolls	1,152.75
Labor vouchers	124.75
Lumber and millwork	727.32
Roofing tin and metal work	2,675.25
Plumbing and material	1,057.05
Brick, lime, sand, etc	11.20
Paint, oil, and glass	273.94
Marble and tile work	28.45
Hardware	84.73
Electrical work and material	687.61
Construction work	464.38
Painting	288.50
Total	7,800.00
Appropriated sundry civil act approved May 27, 1908	7,800.00

REPAIRS TO COURT OF CLAIMS BUILDING.

Roofing and tinwork	$188.00
Lumber and millwork	272.15
Glazing	35.00
Reserved for unpaid bills	4.85
Total	500.00
Appropriated legislative act approved May 22, 1908	500.00

ENGINE HOUSE, SENATE AND HOUSE STABLES.

Lumber	$188.80
Paint, oil, and glass	7.96
Hardware	53.86
Pay rolls	366.00
Plumbing material	5.71
Labor vouchers	724.75
Roofing and tinwork	102.86
Whitewashing	35.00
Lime, cement, and sand	1.40
Reserved for unpaid bills	13.66
Total	1,500.00
Amount appropriated sundry civil act approved May 27, 1908	1,500.00

HOUSE OFFICE BUILDING.

The House Office Building was occupied January 10, 1908, under very unfavorable circumstances, some details connected with the plumbing, steam heating, and ventilation not being completed. Owing to the uniform courtesy of the membership of the House, and notwithstanding these deficiencies in the building, the domestic affairs proceeded through the session of Congress with general satisfaction. At the date of the meeting of the second session of the Sixtieth Congress the ventilating apparatus had been completed; the inner court of the building had been supplied with a large central fountain and large lawn reaching to an asphalt driveway and the sidewalk running around the inner walls of the building. Other conveniences, such as barber shop, bathing rooms, etc., were finished and put into service. With the exception of the rotunda section of the building the corridors have been painted. During the past fiscal year the large marble approaches to the building have been put under way, and the principal section at the main entrance and along B street completed.

The domestic management of the building for the past fiscal year has been under the direction and supervision of this office. This service included not only the ordinary real estate care and maintenance, but the general housekeeping and cleaning as well.

SENATE OFFICE BUILDING.

The Senate Office Building was completed to such an extent that on March 5 the building was turned over to the Senate Committee on Rules for the allotment and disposition of rooms.

Furniture, rugs, etc., had been furnished, and although the walls and corridors were still in the white, the occupancy of the building proceeded through the extra session of Congress with general good nature and little complaint. It is expected that the present fiscal year will see the completion of the painting in the corridors and office rooms, and the final erection and completion of two private elevators and two main stairways, the two latter of which were unavoidably delayed.

Up to this date the principal section of the outer marble approach to the building has been completed. Both the House and Senate office buildings, during the past season, have been heated from temporary

plants installed near each building, and the lighting of the buildings carried on by current obtained and purchased from the outside. It is expected that both will be heated and lighted during the coming winter from the new heating, lighting, and power plant to which I now refer.

CONGRESSIONAL HEATING, LIGHTING, AND POWER PLANT.

The congressional heating, lighting, and power plant is designed to furnish heat, light, and power to the Capitol building, the Senate and House office buildings, the Congressional Library building, and such other government building as may be erected adjacent to the Capitol grounds.

On account of various delays due to the execution of the contracts, and gathering together of the immense amount of detail in labor and material in order to formulate a complete plan of action, the work on this plant has not progressed as rapidly as hoped for, but it is expected, now that operations are well under way, that the entire plant will be ready for service the coming winter.

The construction of the steam-transmission tunnel and electric conduits starting from the power house in Garfield Park and running up First street to the Senate Office Building, together with the branches to the Capitol and the Library, are nearly completed, only the short branches running to the Capitol and to the Library remaining yet to be constructed.

The construction work of the building proper is well under way, the foundations having been completed, and the brickwork of the superstructure carried to 65 per cent of completion. All the principal contracts have been awarded and material coming in. A double waterway has been constructed reaching from the power house to the river, a distance of 4,500 feet. Each building is to be supplied with substations for the conversion of the high-pressure electricity supplied by the power plant proper into the kind and character of current required for each of the buildings. The substations in the House and Senate office buildings have both been in satisfactory operation during the past year. That at the Capitol building has been installed complete and is ready for service.

The construction of this congressional power plant is under the legislative supervision of the House Office Building Commission, to which commission the Superintendent of the Capitol reports in detail. All detailed reports with reference to the Senate and House office buildings are made to the Senate and House Office Building commissions, respectively.

ELLIOTT WOODS,
Superintendent U. S. Capitol Building and Grounds.

The SECRETARY OF THE INTERIOR.

REPORT OF THE ACTING SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

REPORT OF THE ACTING SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

OFFICE OF SUPERINTENDENT,
Yellowstone Park, Wyo., October 15, 1909.

SIR: I have the honor to submit annual report of the conditions in the park from October 15, 1908, to the present date.

The Yellowstone National Park, set aside by act of March 1, 1872 (secs. 2474 and 2475, R. S., 17 Stat., 32), is located in the States of Wyoming, Montana, and Idaho. It has an area of about 2,142,720 acres, and an average altitude of about 8,000 feet.

TRAVEL.

The season of 1909 opened on June 5, about ten days earlier than usual. The early opening necessitated the expenditure of a large sum of money for shoveling snow. This expenditure was a total loss to the Government, as no permanent repairs were effected by it. As a matter of fact it was a detriment, as cutting a passageway through the snow banks for several miles made the roadway a gutter for the melting snow on the sides, and the roadbed was thereby seriously damaged. It is not believed advisable to attempt, in future, the opening up of the roads in advance of the probable melting of the snows.

The aggregate number of persons taking the park trip during the season of 1909 was as follows:

Travel in park during season of 1909.

Yellowstone National Park Transportation Company, entering via northern entrance		9,689
Monida and Yellowstone Stage Company, entering via western entrance		5,905
Others at hotels, traveling with private or government transportation, bicyclers, foot travelers, etc		1,362
Total with regular companies		16,956
Wylie Permanent Camping Company:		
Entering park via northern entrance	5,024	
Entering park via western entrance	2,693	
	7,717	
Other licensees of personally conducted camping parties	3,783	
Total number camping, traveling with licensed transportation		11,500
Making trip with private transportation as "camping parties"		3,307
Total number making tour of park		31,763
Making short trips with special licensees		782
Grand total of all visitors to the park, season of 1909		32,545

During the season 7,959 tourists took the trip across Yellowstone Lake with the T. E. Hofer Boat Company. Of this number 3,636 were traveling with the Yellowstone National Park Transportation Company, 1,300 with the Monida and Yellowstone Stage Company,

1,941 with the Wylie Permanent Camping Company, and the balance, 1,082, were traveling with licensed and private camping parties.

Travel by the different entrances.

By the main gate on the north, Gardiner Station	20,956
By the Madison River road on the west, Yellowstone Station	10,380
By the road leading from Jackson Hole on the south, Snake River Station	400
By the government road from Cody on the east, Sylvan Pass Station	805
By the Cooke road, northeast corner, Soda Butte Station	4
Total	32,545

MEANS OF TRANSPORTATION.

The Yellowstone National Park Transportation Company owns 6 six-horse Concord coaches (used from Gardiner to Mammoth Hot Springs only), 87 four-horse Concord coaches, 43 surreys, 14 formation wagons, and 46 spring wagons, for use in transporting tourists through the reservation, in addition to necessary baggage, express, and freight wagons, carts, buggies, etc. These require the use of 675 horses in the park.

The Monida and Yellowstone Stage Company owns 103 passenger vehicles, consisting of 51 four-horse Concord coaches, 32 surreys, and 20 spring wagons, for use of tourists. This company had 319 horses in the park, but was obliged to hire additional teams to handle the travel from the west side.

The Wylie Permanent Camping Company owns 94 vehicles, of which 27 are Concord coaches, 63 mountain spring wagons, and 4 surreys. This company had 378 horses in the park.

In addition to the above, licenses were issued covering 181 wagons and 196 saddle and pack animals, for use in connection with tourist travel in the park.

ROADS.

The following notes are furnished by Capt. Wildurr Willing, United States Corps of Engineers, as to the work performed under his supervision:

Work in connection with the maintenance and repair of the improvements of the Yellowstone National Park for the season of 1909 was begun on March 11, by a small crew, in the Gardiner Canyon, making repairs to the road and the retaining wall at the bend about 1½ miles from Gardiner.

The work of opening the roads was begun on May 1, when two snow crews, aggregating 65 men and 11 teams, were started from Mammoth Hot Springs. These crews were sent out twenty days earlier than in 1908, on account of the earlier opening of the tourist season and the great amount of snow on the ground. Snow was encountered practically all the way from Mammoth Hot Springs, and the road across the Continental Divide was not open for traffic until June 15. Clearing the snow itself was very costly, and the damage to the roads from the melting snow, running down the passages opened in the same, was considerable.

A crew was sent out on the Cooke City road on June 8 and has worked on this road from the park boundary to Mammoth Hot

Springs throughout the season, repairing washouts, removing slides, and replacing small bridges and culverts.

On June 14 a small party left Cody, Wyo., to repair and open up the east road to traffic. Only such work was done in the adjoining forest reserve as would insure the passing of vehicles. The road within the park was gone over pretty thoroughly, though the melting snow did some damage around Sylvan Pass after the crew had passed beyond it.

The south road was repaired as far as the Buffalo Fork of Snake River, with the exception of a bridge over Pacific Creek, which it was not thought advisable to reconstruct. A bridge over the Buffalo River was repaired.

The west road, including the two branches, was pretty thoroughly repaired during August and September, principally with the grader, as this is an earth road.

A party was sent over the Mount Washburn road as far as Tower Falls early in July to open it to traffic. Some snow was encountered on Mount Washburn, but the greater part of the work consisted in removing earth and rock slides from the road.

Bad washouts occurred on the Gardiner road during the very high water in the Gardiner River in June, necessitating the employment of a large force of men for a considerable period, to save the road to traffic. Washouts also occurred along Gibbon River and Spring Creek during this month. Many small bridges and culverts throughout the park washed out during the high water, among them being those at Willow Creek, Alum Creek, and Otter Creek.

During early July high water in Yellowstone Lake, with strong inshore winds, caused bad washouts on the Lake-Thumb road in the vicinity of the Lake Hotel and the Thumb Station. Substantial retaining walls were constructed to hold the road in these places, and the road was raised about 2 feet.

Early in the season repairs were made to the Mammoth Hot Springs-Gardiner road. Minor repairs were also made to the old road between the above points, and to the Bunsen Peak road.

The sprinkling system was inaugurated during the latter part of June, and was maintained over the greater portion of the main belt line until early in September.

Throughout the season repairs were made to the main belt line by small parties. The Lake-Thumb road, however, received little attention owing to the work rendered necessary by washouts along the lake.

A number of small bridges throughout the park were repaired, and new decking laid on some of the larger ones. Nearly all of the steel bridges were painted.

Near the end of the tourist season practically the entire belt line was gone over with graders and drags, and the roads were in very good condition at the close of the season.

There are extensive portions of the road, varying from 4 to 7 miles in length, which are not sprinkled. The difficulty with which water could be brought to these points and the cost of the pipe necessary, have been offered as reasons for the nonsprinkling. I believe that it would be advisable to expend the money necessary to properly equip the route with tanks and wagons, as the comfort of the traveling public is greatly increased by traveling over roads upon which there

is no dust. In fact, no other feature of the travel is so often remarked upon as the comfort arising from sprinkling. In addition to the comfort to the tourists there is also a saving to the roadbed by the use of water, as the maintenance of the road is greatly simplified if it is continually sprinkled.

The road leading from the west has been watered but little in times past, but as now about 40 per cent of the first-class travel enters from that side, the time has come when this road should be as well sprinkled as those in the other portions of the park. If a special appropriation could be obtained for the installation of a plant, the regular appropriation would be sufficient in future to operate it. The cost of installing this additional plant would be about $15,000, or $750 per mile.

Attention is invited to the desirability of the transportation companies utilizing the road over Mount Washburn, which was constructed at an expense of over $100,000. The objects of building this road were two: First, to give tourists an opportunity of enjoying one of the finest views in the United States; and second, to avoid repeating a portion of the route in making a tour of the park. The route from the Grand Canyon to the Mammoth Hot Springs via Mount Washburn and Tower Falls is about 10 miles longer than the route via Norris, and is of course somewhat harder on stock. Moreover, there is no lunch station at Tower Falls. It is impracticable to use this route before July 15, and usually it can not be used after September 15. Of course if it were to be a part of the regular route it would be necessary to establish a lunch station at Tower Falls, which would materially increase the expense to the Yellowstone Park Association, and would be an entirely extra expense, as the crew there would be employed but a very short time and on certain days might not be employed at all. For the reasons mentioned it would be impracticable to make it a part of the regular tour, but it would be easy to arrange for people to have their lunches carried with them from the Canyon Hotel and to stop for luncheon by the wayside, in all cases where the tourists desired to do so, the company being authorized to make an additional charge of $2.50 to pay for the extra work upon the stock. At present it is impossible for a tourist to go by the Mount Washburn route without paying for an additional day, though the length of time in making the trip is but a few hours in excess of that by the regular route.

FISH.

During the summer 50,000 eastern brook trout were received from the hatchery at Spearfish, S. Dak., of which 10,000 were planted in Glen Creek and 40,000 in Willow Creek; 5,000 land-locked salmon were also shipped in by the Fish Commission and planted in Yellowstone Lake; 400,000 black-spotted trout were planted by the United States Fish Commission in Cub Creek, on the eastern shore of Yellowstone Lake. These, however, were not shipped in, but were taken from the supply collected by the commission at the hatchery maintained in the park, which is a branch of, and maintained from, the regular hatchery at Spearfish, S. Dak. This subhatchery is the greatest field collecting station for the Rocky Mountain, or black-spotted, trout in the country. Mr. D. C. Booth, the superintendent, states that during the period it has been operated, covering nine years, over

33,000,000 eggs of the black-spotted species have been collected from Yellowstone Lake, and after being held until they reached a sufficient stage of development most of them were shipped to various parts of the country to be planted, some of them going to foreign lands. Over 12,000,000 of this number were collected during the past two years.

Mr. Booth also writes as follows:

> It is to be regretted that so much sensational talk is each year given out to tourists and others by misinformed people with reference to the prevalence of parasites on the trout of Yellowstone Lake. It has been the experience of the writer, covering a period of nine years, and during that time handling several hundred thousand trout caught from Yellowstone Lake, that comparatively few are even affected, much less diseased, and from the fact that the eggs are carried long distances, thousands of miles in some instances, and arrive in better condition and produce healthier fry and fingerling trout, is positive proof that their parents are not the diseased specimens some people represent them as being.

At my request the Bureau of Fisheries recently had six special pack cans made and shipped to the park. These cans are intended for use in planting fish in streams that can not be reached by wagon—the cans to be carried on pack animals for long distances.

WILD ANIMALS.

ANTELOPE.

The herd of antelope which is fed at the alfalfa field during the winter and scatters throughout the mountains in the summer is evidently increasing. The preservation of this herd is due to the fence along the northern boundary and to the feeding of alfalfa during the winter. The natural instinct of the animal carries it down the valleys to escape the cold storms of the winter, and it was found that they would crawl beneath the fence where even small holes could be found. As soon as they succeeded in getting outside the fence they became the prey of all the ranchers and miners along the river. It therefore became necessary during the past winter to supplement the fence by wire netting, closing up all holes along gullies, in order to insure there being no possible hole through which they could crawl.

On March 19 a pair of antelope were shipped to the National Zoological Park at Washington, D. C., but unfortunately both died after reaching Washington. About 40 antelope died in the vicinity of the alfalfa field, where they spent most of the winter. An attempt was made to ascertain the cause of death, and from autopsies made it is believed that it was due to pneumonia.

DEER.

Both the black-tailed or mule deer and the white-tailed or Virginia deer are found in the park. About 500 of the former and 60 of the latter were fed alfalfa during the past winter; 250 black-tailed deer were seen daily on the parade at Fort Yellowstone, where they were fed. The others were to be seen between Gardiner and the fort, along the road leading between these two points, where hay was scattered three times a week. It was noted that nearly every female was accompanied by two fawns; in few instances was there but a single fawn. There was a considerable loss of life in March, due to

what was believed to be pneumonia, but even with this loss there was a large net increase over the number present during previous years.

On March 15 two fine female mule deer were shipped to the National Zoological Park at Washington, D. C., where they are reported doing well. Soon after their arrival in Washington they each had two fawns, two of which were reported as strong and healthy and doing well; the other two were weakly and soon died.

ELK.

A conservative estimate would place the number of elk in the park at between 30,000 and 40,000. Undoubtedly some little poaching is done on the borders of the park during the winter, but it is believed that this poaching is but limited in extent, and it is hoped to prevent it in future.

MOOSE.

Moose were seen on the Bechler River, in the southwestern portion of the park, and some were also seen in the southeastern portion. Whether they are increasing in number is not known, as no estimate has ever been formed of the number in the park at any given period.

BUFFALO.

WILD HERD.

A herd of 11 wild buffalo was seen on Cache Creek May 19, at which time a bull calf was caught and is being reared by a domestic cow at the buffalo corral. Another small herd of 9 was seen near Pelican Creek in April. Signs were also seen in the southwestern part of the park in July of this year.

FENCED HERD.

One old cow had to be killed in October, 1908, on account of old age and sickness, after the annual report of my predecessor had been forwarded. Her head was turned over to the National Zoological Park at Washington, D. C., as a specimen. One additional calf (female) was born in October of last year, also after the annual report had been made. Two old bulls have been killed during the past year—one because he became vicious and gored the keeper's horse to death; the other because he had become so lame as to be unable to walk. In the latter case, the lameness was due to the buffalo's having twisted some loose wire about his leg so tightly as to stop the circulation. The wire was so firmly embedded in the hair as to be invisible, and it was with great difficulty that the animal was separated from the herd in order to ascertain the trouble. An attempt was made to remove the wire, but the animal was so powerful that it was impossible to hold him, and it was ascertained that he would undoubtedly lose his foot, hence it was deemed wiser to kill him. In both cases the skeleton and skin were sent to the Smithsonian Institution to serve for mounted specimens.

The increase in the number of calves was gratifying, there being 22 calves this year, in addition to the one caught from the wild herd. The herd now numbers 95 animals.

Fourteen bulls were removed from the Lamar Valley to the pasture at Mammoth Hot Springs. This was done for two reasons: First, to remove the bulls from the herd in which the calves were present, as the bulls were continually fighting and endangering the lives of the calves; second, in order that the visiting tourists might be able to view them. Probably 10,000 tourists drove to the buffalo corral this summer in order to see these buffalo, it being the main feature of the stop at Mammoth Springs.

With the herd increasing as rapidly as it is, a greater area will be necessary to be used as a hay meadow next year. About 150 tons of hay have been put up this year, and this amount will have to be increased in future. Two thousand five hundred dollars has been appropriated for the maintenance of the buffalo in the past. This sum is now too small, as the herd has more than quadrupled in number. It is urgently requested that this appropriation be increased to $4,000.

It is my intention to turn out one or two of the old bulls to join the wild herd if it again comes near the present corral. Last spring it approached within 3 miles. It is believed that these bulls will induce the herd to remain near the corrals, and if they are then fed they will become less wild, and may eventually be incorporated with the present herd.

BEAR.

Although bear are protected absolutely in the park, it seems rather remarkable that they are not increasing in numbers to any great extent. Though every year a large number of cubs are seen at each of the stations, the total number seen each year remains about the same. Whether or not after the hotel season closes they wander outside the limits of the park and become a ready prey of the visitors at the hunting lodges which surround the park is not known. It certainly seems highly probable.

COYOTES.

Quite a number of coyotes were killed last year—about 60 in all, but still they seem to increase. It is doubtful, however, if they kill much game, as the deer seem to be able to protect themselves. On several occasions last winter I saw deer chasing coyotes instead of being chased by them.

MOUNTAIN SHEEP.

About 70 mountain sheep were fed during the past winter. There seem to be but few lambs in the flock. These sheep are as tame as domesticated sheep, and in the spring, while going back and forth to the target range across the hills, bands of from 5 to 10 could be passed within 20 feet without their running away.

TRIALS OF OFFENDERS.

The following cases were tried before the United States Commissioner in the park since October 14, 1908:

1908.

Oct. 22. United States *v.* Joseph Strukly. Charge, hunting wild animals in Yellowstone National Park. Defendant acquitted.

Oct. 23. United States *v.* Joseph Strukly. Charge, violation of paragraph 11 of the Rules and Regulations promulgated by the Secretary of the Interior for the management and care of Yellowstone National Park. Defendant committed to twenty days' imprisonment and ordered to pay costs.

Oct. 30. United States *v.* Mike Brezvonik and John Petek. Charge, killing wild animals in Yellowstone National Park. Defendants fined $100 each and costs, with forfeiture of guns.

Nov. 12. United States *v.* Samuel T. Eagle. Charge, violation of paragraph 11 of the Rules and Regulations promulgated by the Secretary of the Interior with reference to the management and care of Yellowstone National Park. Defendant fined $50 and costs.

Nov. 14. United States *v.* Ham Peterson. Charge, same as in last case. Defendant fined $50 and costs.

Nov. 19. United States *v.* Hugh C. Donley. Charge, hunting wild animals in Yellowstone National Park. Defendant fined $50 and costs.

Nov. 21. United States *v.* Thomas M. Flynn. Charge, carrying firearms in Yellowstone National Park without the permission of the superintendent thereof. Defendant fined $25, including costs.

1909.

Apr. 21. United States *v.* John Graham and John Howell. Charge, violation of paragraph 6 of the Rules and Regulations promulgated by the Secretary of the Interior with reference to the management and care of Yellowstone National Park. Defendants ordered to pay costs of prosecution.

FOREST FIRES.

There have been no forest fires during the year.

TRAILS.

But few trails have been built through the park which could be used by scouts and others in making patrols, or by persons on pleasure bent. These trails have of recent years become practically impassable, due to fallen timber, washed out culverts, etc. They should be put in proper condition, and an effort will be made the coming year to do so.

INCREASED GARRISON.

On May 13, 1908, the garrison was increased to four troops of 100 men each. On the relief of the four troops of the Eighth Cavalry, but three troops of the Fifth Cavalry were sent to replace them. It was believed that this number would be sufficient to efficiently perform all the duties required of the troops in the park. The work, however, in the summer is very arduous, and it has developed that three troops do not furnish sufficient men to perform all the duties required. It is therefore earnestly recommended that the garrison be increased to four troops, or a full squadron.

A full pack train should also be furnished this post, in order that patrolling through the mountains can be properly performed, as it is

in the mountains that the poaching is done, and there should at all times be two or three patrols moving about the park, away from the beaten tracks.

ESTIMATES.

The following estimates of funds required for the ensuing year have been submitted: For administration and protection, including $6,820 for salaries of chief clerk, 5 scouts, and a teamster, $8,670; maintenance of buffalo, including $1,920 for buffalo keeper and assistant, $4,000; total, $12,670.

RECOMMENDATIONS.

The recommendation of my predecessor that an appropriation be granted for the construction of a wire fence 5 miles in length on the western boundary line of the park, extending from the Madison River south, with a gateway entering from the railway station at Yellowstone, is renewed. The outpost station on the west side is 4 miles inside of the western boundary, and people enter and do shooting in the strip between the western boundary and the soldier station, pretending that they did not know that the boundary began west of the station.

Very respectfully,

H. C. Benson,
Major, Fifth Cavalry, Acting Superintendent.

The Secretary of the Interior.

RULES AND REGULATIONS.

REGULATIONS OF JULY 2, 1908.

The following rules and regulations for the government of the Yellowstone National Park are hereby established and made public, pursuant to authority conferred by section 2475, Revised Statutes, United States, and the act of Congress approved May 7, 1894:

1. It is forbidden to remove or injure the sediments or incrustations around the geysers, hot springs, or steam vents; or to deface the same by written inscription or otherwise; or to throw any substance into the springs or geyser vents; or to injure or disturb, in any manner, or to carry off any of the mineral deposits, specimens, natural curiosities, or wonders within the park.

2. It is forbidden to ride or drive upon any of the geyser or hot-spring formations, or to turn stock loose to graze in their vicinity.

3. It is forbidden to cut or injure any growing timber. Camping parties will be allowed to use dead or fallen timber for fuel. When felling timber for fuel or for building purposes when duly authorized, stumps must not be left higher than 12 inches from the ground.

4. Fires shall be lighted only when necessary, and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

5. Hunting or killing, wounding or capturing any bird or wild animal, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed in the park under other circumstances than prescribed above, will be forfeited to the United States, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation, and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof. On arrival at the first station of the park guard, parties having firearms, traps, nets, seines, or explosives will turn them over to the sergeant in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the park.

6. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent of the park in any of the waters of the park or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

7. No person will be permitted to reside permanently or to engage in any business in the park without permission, in writing, from the

Department of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion, and no pack trains shall be allowed in the park unless in charge of a duly registered guide.

8. The herding or grazing of loose stock or cattle of any kind within the park, as well as the driving of such stock or cattle over the roads of the park, is strictly forbidden, except in such cases where authority therefor is granted by the Secretary of the Interior. It is forbidden to cut hay within the boundaries of the park, excepting for the use of the wild game, and such other purposes as may be authorized by the Secretary of the Interior or the park superintendent.

9. No drinking saloon or barroom will be permitted within the limits of the park.

10. Private notices or advertisements shall not be posted or displayed within the park, except such as may be necessary for the convenience and guidance of the public, upon buildings on leased ground.

11. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the park, and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

12. It is forbidden to carve or write names or other things on any of the mileposts or signboards, or any of the platforms, seats, railings, steps, or any structures or any tree in the park.

Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor, and be subjected to a fine as provided by the act of Congress approved May 7, 1894, "to protect the birds and animals in Yellowstone National Park and to punish crimes in said park, and for other purposes," of not more than one thousand dollars, or imprisonment not exceeding two years, or both, and be adjudged to pay all costs of the proceedings.

INSTRUCTIONS OF JULY 2, 1908.

(1) The feeding, interference with, or molestation of any bear or other wild animal in the park in any way by any person not authorized by the superintendent is prohibited.

(2) *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth, well packed down. Care should be taken that no lighted match, cigar, or cigarette is dropped in any grass, twigs, leaves, or tree mold.

(3) *Camps.*—No camp will be made at a less distance than 100 feet from any traveled road. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung at a nearer distance than this to the road. The same rule applies to temporary stops, such as for feeding horses or for taking luncheon.

Many successive parties camp on the same sites during the season, and camp grounds must be thoroughly cleaned before they are abandoned. Tin cans must be flattened and, with bottles, cast-off clothing, and all other débris, must be deposited in a pit provided for the purpose. When camps are made in unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive to the eye.

(4) *Bicycles.*—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curve. In passing a team from the rear, the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

(5) *Fishing.*—All fish less than 6 inches in length should at once be returned to the water with the least damage possible to the fish. No one person shall catch more than twenty fish in one day.

(6) *Dogs.*—Dogs and cats are not permitted in the park.

(7) *Grazing animals.*—Only animals actually in use for purposes of transportation through the park may be grazed in the vicinity of the camps. They will not be allowed to run over any of the formations, nor near to any of the geysers or hot springs; neither will they be allowed to run loose within 100 feet of the roads.

(8) *Hotels.*—All tourists traveling with the authorized transportation companies, whether holding hotel coupons or paying cash, are allowed the privilege of extending their visit in the park at any of the hotels without extra charge for transportation. However, twenty-four hours' notice must be given to the managers of the transportation companies for reservations in other coaches.

(9) *Boat trip on Yellowstone Lake.*—The excursion boat on Yellowstone Lake plying between the Lake Hotel and the Thumb Lunch Station at the West Bay is not a part of the regular transportation of the park, and an extra charge is made by the boat company for this service.

(10) *Driving on roads of park.*—(*a*) Drivers of vehicles of any description, when overtaken by other vehicles traveling at a faster rate of speed, shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(*b*) Vehicles, in passing each other, must give full half of the roadway. This applies to freight outfits as well as any other.

(*c*) Racing on the park roads is strictly prohibited.

(*d*) Freight, baggage, and heavy camping outfits on sidehill grades throughout the park will take the outer side of the road while being passed by passenger vehicles in either direction.

(*e*) In making a temporary halt on the road for any purpose, excepting for lunch or camp, all teams and vehicles will be pulled to one side of the road far enough to leave a free and unobstructed passageway.

(*f*) In rounding sharp curves on the roads, like that in the Golden Gate Canyon, where the view ahead is completely cut off, drivers will slow down to a walk. Traveling at night is prohibited except in cases of emergency.

(*g*) Transportation companies, freight and wood contractors, and all other parties and persons using the park roads will be held liable for violation of these instructions.

(*h*) Pack trains will be required to follow trails whenever practicable. During the tourist season, when traveling on the road and vehicles carrying passengers are met, the pack train must move off the road not less than 100 feet and await the passage of the vehicle.

(*i*) During the tourist season pack animals, loose animals, or saddle horses, except those ridden by duly authorized persons on patrol or other public duties, are not permitted on the coach road between Gardiner and Fort Yellowstone.

(*k*) Riding at a gait faster than a slow trot on the plateaus near the hotels where tourists and other persons are accustomed to walk is prohibited.

(*l*) Mounted men on meeting a passenger team on a grade will halt on the outer side until the team passes. When approaching a passenger team from the rear warning must be given, and no faster gait will be taken than is necessary to make the passage, and if on a grade the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

(*m*) All wagons used in hauling heavy freight over the park roads must have tires not less than 4 inches in width. This order does not apply to express freight hauled in light spring wagons with single teams.

(11) *Miscellaneous.*—Automobiles are not permitted in the park.

Persons are not allowed to bathe near any of the regularly traveled roads in the park without suitable bathing clothes.

All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent in writing before the complainant leaves the park.

(12) The penalty for disregard of these instructions is summary ejection from the park.

Information relative to side trips in the park and the cost thereof can be procured from those authorized to transport passengers through or to provide for camping parties in the park, also at the office of the superintendent.

REGULATIONS OF OCTOBER 11, 1900, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed in the Yellowstone National Park without authority from the Secretary of the Interior will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notices of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of any animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of

such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within thirty days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after ten days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale such proceeds shall be turned into the Yellowstone National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

DEPARTMENT OF THE INTERIOR
GENERAL LAND OFFICE
FRED DENNETT, COMMISSIONER.

YELLOWSTONE NATIONAL PARK

Compiled from the official Records of the General Land Office. U.S.Geological Survey and other sources
under the direction of
I.P. BERTHRONG
Chief of Drafting Division G.L.O.
1903
Scale: 1 inch = 3 Miles

LEGEND
Completed Roads
Trails
Projected Roads
Stations
Snowshoe Cabins

LEGEND
Park Boundary
State Boundaries
Forest Reservations

GALLATIN NATIONAL FOREST
ABSAROKA NATIONAL FOREST
BEARTOOTH NATL. FOREST
GALLATIN RANGE
MADISON VALLEY
SHERMAN RANGE
LONGEVITY RANGE
BUFFALO PLATEAU
MIRROR PLATEAU
Electric Pk
Mt Evarts
Quadrant Mountain
Druid Pk
Mt Norris
Baronet Pk
Abiather Pk
Sulphur Mt
Gibbon Hill
Sulphur Plateau
Hellroaring Mt
Crescent Hill
Yancey's
Terrace Mountain
Bunsen Pk
Fan Mt
Amphitheater
Thunderer
Thumb Pk
Beam Pk
Gray Pk
Purple Mt
Fountain
Gallatin R
Yellowstone R
Gardiner
Cinnabar
Mammoth Hot Springs
Norris Geyser Basin
Tower Falls
Canyon
Lake
Grand Canyon of the Yellowstone
Upper Falls
Lower Falls
Inspiration Point
Artist Point
Mount Washburn
Dunraven Peak
Sepulcher Mt
Specimen Ridge
Amethyst Mountain
Trout Pk
Trout Creek
Slough Creek
Soda Butte Creek
Lamar River
Lamar Valley
Pebble Creek
Miller Creek
Cache Creek
Thorofare Creek
Yellowstone Lake
Shoshone Lake
Heart Lake
Mary Bay
Stevenson Island
Frank Island
Dot Island
Molly Island
Dragon's Mouth Spring
Mud Volcano
Sour Creek
Hayden Valley
Alum Creek
Otter Creek
Elk Creek
Cougar Creek
Grizzly Lake
Amethyst Mountain
Observation Peak
Mount Holmes
White Mountain
Quadrant Mountain
Electric Peak
Sphinx Mountain
Druid Peak
Mount Norris
Baronet Peak
Abiather Peak
Sulphur Mountain
Gibbon Hill
Hellroaring Mountain
Crescent Hill
Terrace Mountain
Bunsen Peak
Fan Mountain
Amphitheater Mountain
Thunderer
Thumb Peak
Beam Peak
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Mud Volcano
Sour Creek
Hayden Valley
Alum Creek
Otter Creek
Elk Creek
Cougar Creek
Grizzly Lake
Observation Peak
Mount Holmes
Sphinx Mountain
Sulphur Mountain
Sulphur Plateau
Mirror Plateau
Buffalo Plateau
Longevity Range
Sherman Range
Gallatin Range
Madison Valley
Gallatin National Forest
Absaroka National Forest
Beartooth Natl. Forest

YELLOWSTONE LAKE

GEYSER BASIN

MADISON PLATEAU

CONTINENTAL DIVIDE

SHOSHONE LAKE

PITCHSTONE PLATEAU

RED MOUNTAINS

FLAT MOUNTAIN

ELEPHANT BACK

STEVENSON I.D.

FRANK I.D.

PEALE I.D.

MOLLY I.D.

TWO OCEAN PLATEAU DIVIDE

SNAKE RIVER

YELLOWSTONE RIVER

TARGHEE NATIONAL FOREST

TETON NATIONAL FOREST

SHOSHONE NATIONAL FOREST

Longitude West from Greenwich

Compiled and drawn by I P Berthrong

Lettered by C J Helm

REPORT OF THE ACTING SUPERINTENDENT OF THE YOSEMITE NATIONAL PARK.

REPORT OF THE ACTING SUPERINTENDENT OF THE YOSEMITE NATIONAL PARK.

YOSEMITE NATIONAL PARK,
OFFICE OF THE SUPERINTENDENT,
Yosemite, Cal., October 15, 1909.

SIR: I have the honor to submit the following report of conditions and administration in the Yosemite National Park during the season of 1909:

GENERAL STATEMENT.

This park is situated in Tuolumne, Mariposa, and Mono counties, Cal., and originally covered an area of about 1,512 square miles. The lands embraced therein were set aside by act of Congress approved October 1, 1890 (26 Stat., 650), and were placed under the supervision of the Secretary of the Interior. By the act of February 7, 1905 (33 Stat., 702), and the joint resolution of June 11, 1906 (34 Stat., 831), the boundaries were changed, excluding a total of 555.94 square miles therefrom and including a total of 168.35 square miles not previously within the reservation, making the present area of 1,124.41 square miles, or 719,622.40 acres. The second change in boundaries included the recession of Yosemite Valley and Mariposa Big Tree Grove to the Federal Government.

Maj. Harry C. Benson, U. S. Army, acting superintendent for several years past, was transferred to the Yellowstone Park, leaving the Yosemite Park on October 25, 1908, and in the interval between that date and that of my arrival in the reservation on April 27 of this year, the affairs of the park were ably administered by the supervisor, Mr. Gabriel Sovulewski.

Pursuant to orders from the War Department, I sailed from Manila, P. I., February 14, 1909, and reported in person to the commanding general, Department of California, on March 15, and by letter to the Secretary of the Interior for assignment to duty as acting superintendent of the Yosemite National Park.

General Orders, No. 40, Department of California, dated March 8, having designated Troops I and M, Fourteenth Cavalry, for duty, these troops, in compliance with that order, marched from the Presidio of San Francisco on April 15 and arrived in the Yosemite Valley on the 27th of that month.

Detachments were at once stationed at Wawona and the Mariposa Big Tree Grove, and from time to time, as the snow melted and made it practicable, detachments were posted at Crane Flats, Merced Big Trees, Aspen Valley, Hog Ranch, Hetch Hetchy Valley, Lake Eleanor, Buck Camp, and Soda Springs. For each of these detachments a schedule of patrols was prepared and a district assigned, and

inspections made as frequently as practicable generally showed an efficient and zealous performance of duty by all of them.

In the latter part of July the number of line officers on duty under me was reduced to three, a number inadequate for efficient service. The extent to which this shortage of officers impaired the efficiency of the park service was duly represented to higher military authority, but no additional officers were available.

At the beginning of the season application was made to the War Department for the detail of an officer of the Corps of Engineers to prepare a comprehensive road and trail project and to superintend road construction in the park, and Lieut. A. R. Ehrnbeck was accordingly detailed, and he has performed much laborious and efficient service.

Through the courtesy of the commanding general, Department of California, a detachment of Company M, Corps of Engineers, was ordered here for surveying duty, and these men were engaged during August and September in surveying the route for a wagon road from Fort Monroe to Glacier Point.

GRAZING.

No sheep have entered the park, and but an inconsiderable number of cattle drifted over the boundary from the forest reserve. No stock has been driven through the park.

FIRES.

The park has been menaced all along its southern boundary and on the west by forest fires that started outside.

One of them started near El Portal and burned along the park border as far as the Merced Big Trees, but it was so successfully opposed by 35 soldiers, under Capt. Rush S. Wells and Lieut. A. C. Wimberly, of the Fourteenth Cavalry, that it never crossed into the park, although the contest lasted for ten days. There have been three fires on the floor of Yosemite Valley, undoubtedly caused by careless visitors. They were discovered and extinguished before doing serious damage. There were two fires in the vicinity of the Eagle Peak trail, one caused by lightning and the other by the usual careless visitor. Both were extinguished before doing much damage. There were two other fires caused by lightning, one near Crane Flats and the other on Smith Peak near the Hetch Hetchy Valley. They were soon extinguished and no great damage was done.

GAME.

A small number of bear, grouse, and quail have been seen during the season. Deer are more numerous, but they drift out of the park when the snowfall inside is heavy and few return. So far there is no reason to suspect that there have been any hunters in the park this season, but the cougar, or mountain lion, and the coyote undoubtedly kill many deer in the park.

FISH.

Forty thousand rainbow trout were received from the Wawona hatchery, 30,000 of which were placed in the Merced River and 10,000

in Tenaya Creek, all in Yosemite Valley. From the Sisson hatchery 20 cans of eastern brook and 12 cans of rainbow trout were received, and 12 cans of eastern brook were placed in Lake Tenaya, the rainbow in the Merced in Yosemite Valley, and the remainder in Crescent Lake and waters in that vicinity.

FENCES.

The repeated recommendation of my predecessor in his annual reports is renewed that the western boundary be fenced, using therefor barbed wire and international steel posts.

There has been no trouble this year from trespassing of cattle or other stock, except upon a portion of the western and southwestern boundary. It is practically impossible to protect the entire western line with the few outposts that can be established, and there results some friction with the owners of cattle that are permitted to graze in the forest reserve immediately up to the boundary, but are not allowed to graze within the park. All of this friction could be easily avoided by the construction of a fence as suggested. It would require about 50 miles of fence, which could readily be put up at a cost of not more than $10,000; and it is believed that this would be one of the wisest measures that could be adopted for the prevention of friction and misunderstanding with cattlemen.

The fence around the Mariposa Big Trees has been extensively repaired and strengthened this season and is now in fine condition. A number of fences in Yosemite Valley have been removed and the inclosures thrown open, adding very much to the attractiveness of the valley.

PATENTED LANDS.

There are approximately 20,000 acres of timber and homestead claims in the park, and I can not urge too strongly the need of action looking toward the acquisition by the Government of all these patented lands.

There are no persons now living upon patented lands within the limits of the Yosemite National Park, with the exception of Mr. Kibby, at Lake Eleanor. All patented lands upon which people were living were excluded from the park by the joint resolution of June 11, 1906. The only patented lands now retained are timber claims and a few claims that were taken up under the homestead act and were never occupied as homesteads, but simply used as a pretext for bringing in stock to stray upon the park lands. These private lands are no longer of any value to their owners, as there is not sufficient grazing on them to keep half a dozen animals during summer. The timber claims are valuable and are becoming more so each year. Some of the finest sugar-pine timber in California lies within the limits of the park, along the line of the road from Wanona to Chinquapin Station. The large tract of timber land which formerly was in the park, but was excluded by the act of February 7, 1905, has already been purchased by a lumber company, and a railroad constructed directly into this timber, and active steps taken to put the lumber upon the market. The Sugar Pine Lumber Company, which formerly was operating about 40 miles south of the Yosemite National Park, is now cutting timber within three-quarters of a mile of the

southern boundary, and the mountains are rapidly being denuded of all timber. This is what will happen to the timber upon all the patented lands within the limits of the park in a very short time unless they are purchased by the Government and all private rights extinguished. This is a matter which needs urgent attention and should no longer be neglected. It would be greatly to the interests of the Government to purchase all private claims within the park and thus extinguish them. The necessity of preserving the forest in this portion of the park and of reducing the number of private claims to such an extent as would justify the Federal Government in purchasing the remaining claims was one of the main points which caused the Yosemite Commission of 1904 to recommend the reduction of the area of the park. This commission, as has every other person who has been charged with the welfare of the park or with making any recommendations with regard to it, recommended that the Government immediately purchase and extinguish all private rights.

TELEPHONE SERVICE.

The telephone service has been extended, repaired, and improved, 47 miles of line being built, and the following outposts are now in telephonic communication with the Yosemite Valley: Wawona, Mariposa Big Trees, Merced Big Trees, Crane Flats, Hog Ranch, Hetch Hetchy Valley, and Lake Eleanor. There are only three not in telephonic communication: Aspen Valley, Buck Camp, and Soda Springs, but the line will be extended to them early next season. The administration and control of the park has been much facilitated by the telephone system, which has also proved a great convenience to the public. The Pacific Telephone and Telegraph Company, by permission of the department, operates its lines from the Yosemite Valley to the outside world by way of El Portal.

ROADS, TRAILS, AND BRIDGES.

The need of a good highway from El Portal, the terminus of the Yosemite Valley Railroad, up to the Sentinel Hotel in the Yosemite Valley, still overshadows all other needs of the park. The construction of a new Telford-macadam road from El Capitan Bridge to the Sentinel Hotel, along the south side of the Merced River, is now progressing under an allotment of $34,100, part from revenues and part from the regular appropriation, a percentage contract having been entered into with Carter & McCauley therefor. The road from El Portal to Pohono Bridge is still so rocky, dusty, narrow, tortuous, and precipitous as to make a drive over it a painful ordeal. All the roads should be widened, metalled, and watered, and in that order, though if the widening and metalling are to be indefinitely delayed it would be well to expend a few thousand dollars in watering the roads as they are.

The road from El Portal to the middle of the Yosemite Valley is about 15 miles long, half of which, when the work in progress is completed, will be a very excellent road. The other half should as soon as possible be widened, straightened, improved in grade, metalled, and watered. In addition to the above there are about 15 miles of roads on the floor of the valley that are dusty and rocky and should

be rebuilt, parts of them being relocated in order to follow more scenic routes. There are also 4 miles of road leading out of the Yosemite Valley toward Wawona, being that part of the Wawona road which originally lay within the state grant, and 4 miles, leading toward Groveland, which was formerly a part of the Big Oak Flat road. All other roads in the park are toll roads, namely, the Big Oak Flat, Coulterville, Wawona, and Tioga roads, and they are all kept in fair condition, except the Tioga road. This latter road runs east and west through the middle of the park, and the portion in the park is about 51 miles long. I have recently passed over most of it and found it in wretched condition.

The three main trails leading up from the floor of the valley to the rim, about 24 miles in total length, are subjected every year to heavy travel, and the wear and tear on them is great. They are always kept in good condition, but it requires constant labor. Most of the remaining trails in the park have had some repairs during the season and all are in fair condition. Many guide signboards have been put up, but more are still needed.

No bridges have been built this season, but new floors were placed in the El Capitan Bridge, and the bridges over the Merced near Camp Curry and over the Tuolumne in Hetch Hetchy Valley were repaired.

Appendix "A" contains the recommendations of Lieutenant Ehrnbeck as to roads, trails, bridges, and engineering structures.

CONCESSIONS.

The following concessions were held in the park during the period from November 1, 1908, to October 31, 1909.

Concessions, November 1, 1908, to October 31, 1909.

No.	Name.	For what granted.	Expiration.	Annual rental.
	LEASES.			
	Cook, J. B.	Sentinel and Glacier Point Hotels	Oct. 31, 1909	$2,700
	Coffman & Kenney	Livery	Oct. 31, 1910	1,000
	Jorgensen, Chris	Studio	Oct. 31, 1914	1
	PERMITS.			
1	Best, H C	Studio, photographs	Oct. 31, 1909	250
2	Boysen, J. T	do	do	250
3	Clark, Galen	Residence	do	1
4	Coffman & Kenney	Blacksmith shop	do	40
5	Degnan, John	Residence	do	20
6	Degnan, Mrs. John	Sale of bread, milk, etc	do	1
7	Fiske, George	Photography	do	20
8	Foley, D. J	Printing office, etc	do	250
9	Leitch, B. M	Cabin, Mariposa Grove	do	20
10	Pillsbury, A. C	Photography	do	250
11	Cook, J. B	Public camp	do	500
12	Salter, N. L	Merchandise store	do	600
13	Curry, D. A	Public camp	do	750
14	Sell, W. M	do	Oct. 31, 1910	600
15	Yosemite S. and T. Co	Transportation	Oct. 31, 1909	1,750
16	Yosemite Trans. Co	do	do	2,100

HOTELS AND CAMPS.

There is only one hotel in the Yosemite Valley and it is old and possesses few conveniences, and should be replaced by a new hotel in the near future. The approved application of Mr. Frank A. Miller for such privilege has not been followed by further action on his part.

Camp Ahwahnee, near the foot of the Glacier Point trail; Camp Yosemite, near the foot of the Yosemite Falls; and Camp Curry, under Glacier Point, were all operated satisfactorily during the summer, and frequent inspections found them, as a rule, clean and sanitary. These camps, with the hotel and its annexes, have been sufficient to comfortably accommodate all visitors during the season.

SAN FRANCISCO WATER SUPPLY.

In 1907 the Secretary of the Interior granted a hearing at San Francisco in regard to reopening the matter of granting reservoir rights of way in the Hetch Hetchy Valley and at Lake Eleanor, in the Yosemite National Park, for the furnishing of an adequate supply of Sierra water for the city of San Francisco, under an application of James D. Phelan, former mayor of the city, which had been filed October 15, 1901, later assigned to the city, and denied by the department. Mr. Marsden Manson, city engineer, department of public works, was given authority to act for the city, and after extended hearings, conferences, and the submission of briefs for and against the proposition, the Secretary, in the exercise of the discretion vested in him by the act of February 15, 1901, reinstated the Phelan application on May 11, 1908, and granted the option which the city of San Francisco desired, until the matter could be submitted to the voters and definite action taken, upon the filing of certain stipulations affording ample protection to the park lands and to the rights of the Modesto and Turlock irrigation districts to the use of the flow of the Tuolumne River. The stipulations provide, among other things, that the Lake Eleanor site shall be developed to its full capacity before beginning the development of the Hetch Hetchy site. The city will be required to pay for timber cut or used in the exploitation of the reservoir sites or rights of way for conduits, etc., and for any power which may be generated in the future and sold commercially.

The city's representatives have surveyed a dam site in sec. 3, T. 1 N., R. 19 E., at Lake Eleanor, and have begun to clear and explore for foundations for the dam, the timber on the site having first been appraised by a forest officer of the Department of Agriculture, at the request of the Secretary of the Interior. A camp site and temporary buildings for the laborers were also established. Preliminary surveys of the Lake Eleanor main canal, running from the dam above mentioned to a junction with the Hetch Hetchy main canal, and of the Cherry Creek diversion canal, running from Cherry Creek, in sec. 8, T. 2 N., R. 19 E., to the Lake Eleanor dam site, were approved by the department on February 25, 1909.

BUILDINGS.

An attractive cottage is now nearly completed, at a cost of nearly $2,800, and is to take the place of the log cabin that has served heretofore as a residence for the supervisor. This cottage is located close to the log cabin and the latter will be torn down. The schoolhouse formerly near Le Conte Lodge has been moved to a more desirable and convenient site about 400 yards north of the Sentinel Hotel. It is recommended that a residence and office building be constructed for the superintendent of the park. The building now used is entirely too small for the purpose.

POWER PLANT, WATER DISTRIBUTION, AND SANITATION.

Work is now in progress, under an allotment of $10,000 from revenues, to remedy the precarious condition of the power plant, which is due to the fact that the pipe furnishing the water runs through a tunnel of loose earth and rock, which tunnel has already caved in, but without damaging the pipe. As further caving of the tunnel seems imminent and as it would necessitate a shut down of the plant for an extended period if it occurred, a new trench for the pipe is being opened around the tunnel so as to completely eliminate the tunnel. The whole plant, however, is of flimsy material and faulty construction and should be replaced by a new plant with greater capacity. In the appendix to the annual report of the acting superintendent for 1908 are reports made by Mr. M. O. Leighton, chief hydrographer, United States Geological Survey, on September 22 and December 4, 1907, describing the critical condition of this plant.

No change has been made in the water distribution service. Its deplorable condition is fully described by Mr. Leighton in his reports referred to above. The method of sewage disposal suggested by Mr. Leighton in 1907 for Camps Ahwahnee and Curry and for Kenneyville, were continued during the season with satisfactory results.

UNDERGROWTH.

The dense thickets that are growing up in nearly every part of the Yosemite Valley should be cleared, and the trees thinned out, careful selection being made to leave the best.

ACCIDENTS.

On June 17 Mr. F. P. Shepherd, of San Francisco, Cal., disappeared, having been last seen between Glacier Point and Sentinel Dome, and although a large detachment of troops sought for him several days he was not found. He is believed to have fallen over some cliff and perished.

On June 26 the horses of a coach belonging to the Yosemite Transportation Company ran away and two passengers were severely hurt.

Mr. H. R. Logan, of Berkeley, Cal., was reported missing on August 6, and it was said that he was last seen near Glacier Point. His body was found on a ledge below Glacier Point on August 14. He had evidently tried to climb down what is known as the "Ledge Trail" and had slipped and fallen about 900 feet. This trail is marked "Dangerous," and its use is forbidden.

VISITORS.

Between November 1, 1908, and April 30, 1909, there were 1,329 visitors to the valley, and between May 1 and September 30, 1909, there were 11,853 visitors to the park, of which number 471 did not come to the valley, an aggregate of 13,182, representing an increase of 50 per cent over the previous year.

About 10,000 of these visitors were transported by the Yosemite Valley Railroad to El Portal and by the Yosemite Transportation

Company from such terminus and were distributed about as follows: Sentinel Hotel, 3,280; Camp Yosemite, 1,950; Camp Curry, 2,116; Camp Ahwahnee, 2,041; and transient camps, 613.

The following list, though incomplete as to the full number of tourists to the Yosemite National Park, indicates the points in the United States and the foreign countries from which 9,938 of the travelers came.

Residence of visitors to Yosemite National Park.

UNITED STATES.		FOREIGN COUNTRIES.	
Alabama	19	England	118
Arizona	29	Germany	94
Arkansas	10	Sandwich Islands	40
California	5,416	France	29
Colorado	70	Scotland	26
Connecticut	53	Canada	28
Delaware	8	Australia	23
District of Columbia	93	China	12
Florida	25	Japan	7
Georgia	54	Ireland	7
Idaho	1	Belgium	7
Illinois	458	Holland	7
Indiana	104	Argentine Republic	7
Iowa	88	India	5
Kansas	90	West Indies	4
Kentucky	63	New Zealand	4
Louisiana	29	Austria	5
Maine	19	Philippine Islands	4
Maryland	75	Switzerland	4
Massachusetts	297	Hungary	4
Michigan	77	Denmark	7
Minnesota	59	East Indies	3
Mississippi	10	Netherlands	3
Missouri	210	Costa Rica	2
Montana	11	Siam	2
Nebraska	51	Porto Rico	2
Nevada	23	Russia	2
New Hampshire	18	Spain	2
New Jersey	117	Sweden	2
New Mexico	11	Brazil	2
New York	711	Norway	1
North Carolina	18	Java	1
North Dakota	13	Sumatra	1
Ohio	264	Guatemala	1
Oklahoma	16	British Columbia	1
Oregon	36	Egypt	1
Pennsylvania	336	Africa	1
Rhode Island	25	Panama	1
South Carolina	12	Turkey	1
South Dakota	11	Ceylon	1
Tennessee	34		
Texas	198	Total	472
Utah	12		
Vermont	8	Grand total	9,938
Virginia	41		
Washington	46		
West Virginia	17		
Wisconsin	74		
Wyoming	6		
Total	9,466		

ESTIMATES.

The following are the estimated expenditures required during the fiscal year ending June 30, 1911:

Estimate for the protection and improvement of Yosemite Valley.

Day labor in repairing existing roads, trails, culverts, and camp sanitation	$7,000
Pay of chief electrician	1,200
Pay of assistant electrician	1,080
Pay of supervisor	1,200
Pay of blacksmith and laborer	900
Pay of plumber and laborer	1,000
Pay of carpenter and laborer	900
Pay of teamster and laborer	900
Pay of clerk	1,200
For purchase of 18 draft animals	3,000
For purchase of 3 sprinkling water wagons and harness	2,400
For purchase of forage for draft animals	2,000
For 3 water wagon sheds and stables	4,500
For 5 teamsters and laborers, 7 months, at $75	2,625
For office and residence for the superintendent	7,500
For material and installation of water system as far as power house	30,000
For material and installation of water distributing system	123,000
For completion of road between El Capitan Bridge and Sentinel Hotel	19,700
For improvement of road between El Portal and Cascade Creek	150,000
For hydraulic rams, tanks, and pipe for road sprinkling	10,000
For removal of undergrowth, dead timber, etc	20,000
For improvement of road from floor of valley to Fort Monroe	10,000
For construction of road from Fort Monroe to Glacier Point	54,150
Total	454,255

Estimate for the protection and improvement of the park proper.

Pay of 3 rangers	$2,900
For barbed wire fence along the western boundary of the park	10,000
For construction of trail from Mirror Lake to Lake Tenaya, about 15 miles	3,500
Total	16,400

RECOMMENDATIONS.

It is recommended: (1) That an appropriation of $179,700 be obtained for the completion of the work of widening, straightening, macadamizing, and watering the El Portal-Sentinel Hotel road; (2) that the water system and power plant be enlarged and increased; (3) that ample hotel accommodations be provided; (4) that all patented lands lying within the park be condemned and purchased by the Government; (5) that an appropriation of $54,150 be obtained for the construction of a road from Fort Monroe to Glacier Point, along the south rim of the valley (when built it will be for its length one of the most remarkable mountain scenic roads in the world; the survey, location, and all other preliminary work has been completed); (6) that the western boundary be fenced; (7) that a permanent post of troops be established in the park; and (8) that Congress enact a law for the government of the Yosemite Park similar to that provided for the Yellowstone Park.

Attention is invited to the report of Lieut. A. R. Ehrnbeck, Corps of Engineers, Appendix A.

Very respectfully, WM. W. FORSYTHE,
Major, Sixth Cavalry,
Acting Superintendent Yosemite National Park.

The SECRETARY OF THE INTERIOR.

APPENDIX A.

REPORT ON ROADS, TRAILS, AND ENGINEERING STRUCTURES.

OFFICE OF THE ENGINEER,
YOSEMITE NATIONAL PARK,
Yosemite, Cal., October 4, 1909.

SIR: I have the honor to make the following report on the existing roads, trails, bridges, and engineering structures in the Yosemite National Park and to also make recommendations on new structures.

The subject is divided into the following heads: Roads, trails, bridges, power and water system, and buildings.

ROADS.

The roads of the Yosemite National Park are: The El Portal-Yosemite road, the Wawona road, the Big Oak Flat road, the Coulterville road, the Tioga road, the Chinquapin-Glacier Point road, and roads on the floor of the valley. Of these roads the Wawona road, the Big Oak Flat road, the Coulterville road, the Chinquapin-Glacier Point road, and Tioga road are toll roads, and only portions of the first three last mentioned are under control of the Government, while the Tioga road and the Chinquapin-Glacier Point road are entirely in the hands of their builders and owners.

EL PORTAL ROAD.

The El Portal road, being the main route of travel from the terminus of the Yosemite Valley Railroad to the Yosemite Valley, is first in importance, nine-tenths of the total number of visitors to Yosemite traveling over this road.

The road follows the right bank of the Merced River from El Portal for a distance of 10 miles, then crosses to the left bank on the Pohono Bridge and follows the left bank of the river to the Sentinel Hotel, a distance of 5 miles farther. The lower 10 miles of road is through very rocky and rough country, composed of soft, loose granite bowlders. This part of the road is very dusty, steep, and rough, and altogether too narrow. Of the 5 miles from the Pohono Bridge to the Sentinel Hotel, 1 mile (between the Pohono and El Capitan bridges) is already improved and 1½ miles more of the road from El Capitan Bridge to the Sentinel Hotel will be completed under an existing contract with work now in progress. The lower 10 miles of road has 3 miles of steep sidehill road and 7 miles

of road through rough bowlder country. To widen to 21 feet between ditches, to grade, straighten, and macadamize this portion of the road will require not less than $30,000 per mile for the 3 miles of sidehill work and $20,000 per mile for the 7 miles of rough bowlder country. To complete the 1½ miles from Sentinel Hotel to the end of the existing improved road will take $15,000 per mile. The total cost of improving the El Portal-Yosemite road, exclusive of bridges and sprinkling system, is then estimated at $90,000, plus $140,000, plus $22,500, or $252,500. These figures are based on the cost of road work now being done in the valley.

For a sprinkling system for this road it is recommended that 8 sprinkling wagons with horses and harness, complete, and 8 hydraulic rams with tanks and pipe for same, be purchased. The cost of the sprinkling system is estimated as follows:

Estimated cost of sprinkling system, El Portal road.

Eight wagons, at $750	$6,000
Eight teams, 4-line	6,400
Eight hydraulic rams, at $60	480
Eight tanks and pipe, at $650	5,200
Total	18,080

WAWONA ROAD.

From near the foot of Bridal Veil Falls to Fort Monroe on the rim of the valley, 4 miles, the Wawona road belongs to the Government. The road is dusty, steep, narrow, and rough. An entirely new location would be needed to obtain a proper grade, and this would mean very expensive construction work, i. e., not less than $30,000 per mile. To improve the existing road it should be widened and ditched on the inside with a paved ditch and then proper drainage provided, with culverts. The total elimination of water breaks (which are much complained against by drivers and passengers) is not recommended, since it would endanger the road. About $3,000 per mile will make great improvements on the Wawona road.

BIG OAK FLAT ROAD.

From El Capitan Bridge to Gentry's sawmill, a distance of 5 miles, this road belongs to the Government. The road is well constructed, with an easy grade and beautiful rough rock walls. The greatest criticism is that the road is too narrow. In my opinion present travel over this road does not warrant any changes on the road. The regular repairs are all that I recommend.

ROADS ON THE FLOOR OF THE VALLEY.

Besides the El Portal-Yosemite road there are about 16 miles of roads on the floor of the valley. These roads should all be widened, graded, and macadamized. The cost would be about $15,000 per mile.

At the present time the stagecoach lines in operation are using coaches with tires 1½ inches to 2 inches wide. A loaded stagecoach weighs about 6,000 pounds, which is an exceedingly heavy load for such small tires. It is recommended that the stagecoach lines be

ordered to provide 3 to 4 inch tires for their stages. This size of tire will improve the roads instead of tearing them down, as the present tire does.

PROPOSED NEW ROADS.

The sites for new roads investigated are as follows:

(1) A road following the southern rim of Yosemite Valley, reaching from Fort Monroe to Glacier Point, a distance of about 14 miles. For 3 miles of this distance the Chinquapin-Glacier Point road is followed from Glacier Point west, then the new road follows the Pohono trail, touching the viewpoints reached by that trail. As a scenic road this will, without a doubt, be one of the best in the world. The estimate of the cost of constructing this road, based on surveys made this summer by Mr. J. M. Bailey and a detachment of engineer soldiers from Company M, First Battalion Engineers, under my direction, is as follows:

Preliminary surveys and reconnaissance work were done by the engineer. Instrumental surveys began on August 18 and were completed on September 30, 1909. The engineer soldier detachment proved efficient and intelligent, and since their work was a direct benefit to the Government without extra compensation than their soldier pay, they saved for the Government some $1,200 to $1,500, and received valuable instruction at the same time.

The following are the quantities of material to be handled on 12, 14, or 16 foot roadway with turnouts 100 feet long at 300-yard intervals.

Material to be handled in constructing proposed Fort Monroe-Glacier Point road.

12-FOOT ROADBED.

Mile—	Embankment.	Excavation.			Clearing.	Culverts.	30-foot bridges.
		Earth.	Loose rock.	Solid rock.			
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Acres.*		
1	1,450	2,665	1,265	120	2	2	
2	1,250	1,420	1,280	160	2		
3	2,200	2,520	1,800	720	2	1	
4	670	2,090	1,100	370	2		
5	2,075	1,755	665	495	2	2	
6	1,955	1,440	410	335	2	3	
7	1,705	1,465	425	280	2	1	1
8	1,165	1,640	525	210	2	2	
9	1,720	2,150	910	450	2	2	
10	1,250	1,080	240	925	2	2	
11	1,655	1,430	60	530	1.973	1	
Total	17,095	19,655	8,680	4,505	21.973	16	1

14-FOOT ROADBED.

1	1,885	3,465	1,645	155	2	2	
2	1,625	1,845	1,665	210	2		
3	2,880	3,275	2,340	935	2	1	
4	870	2,715	1,440	480	2		
5	2,400	2,280	865	645	2	2	
6	2,540	1,870	535	435	2	3	
7	2,215	1,900	550	365	2	1	1
8	1,515	2,135	685	275	2	2	
9	2,235	2,795	1,185	585	2	2	
10	1,625	1,405	315	1,200	2	2	
11	2,150	1,860	80	690	1.973	1	
Total	22,240	25,545	11,305	5,975	21.973	16	1

Material to be handled in constructing proposed Fort Monroe-Glacier Point road—Continued.

16-FOOT ROADBED.

Mile—	Embankment.	Excavation.			Clearing.	Culverts.	30-foot bridges.
		Earth.	Loose rock.	Solid rock.			
	Cu.yds.	*Cu.yds.*	*Cu.yds.*	*Cu.yds.*	*Acres.*		
1	2,175	4,000	1,900	180	2	2	
2	1,875	2,130	1,920	240	2		
3	3,300	3,780	2,700	1,080	2	1	
4	1,005	3,135	1,650	555	2		
5	3,115	2,635	1,000	710	2	2	
6	2,935	2,160	615	500	2	3	
7	2,560	2,200	640	400	2	1	1
8	1,750	2,460	790	315	2	2	
9	2,580	3,225	1,365	675	2	2	
10	1,875	1,620	360	1,390	2	2	
11	2,485	2,145	90	800	1.973	1	
Total	25,655	29,490	13,030	6,895	21.973	16	1

Figuring 4,000 yards of sidehill retaining walls of dry, rough masonry, and considering the construction of culverts as falling into the item of clearing, the estimates of cost are as follows:

Estimates of cost of proposed Fort Monroe-Glacier Point road.

12-FOOT ROADBED.

19,655 cubic yards earth, at 50 cents	$9,827.50
4,000 cubic yards retaining wall, at $1	4,000.00
8,680 cubic yards loose rock, at $1	8,680.00
4,505 cubic yards solid rock, at $2	9,010.00
22 acres clearing, at $250	5,500.00
One 30-foot bridge (rough logs)	500.00
	38,517.50
Engineering and contingencies, 5 per cent	1,925.88
Total	40,443.38

14-FOOT ROADBED.

25,545 cubic yards earth, at 50 cents	12,772.50
4,000 cubic yards retaining wall, at $1	4,000.00
11,305 cubic yards loose rock, at $1	11,305.00
5,975 cubic yards solid rock, at $2	11,950.00
22 acres clearing, at $250	5,500.00
One 30-foot bridge (rough logs)	500.00
	46,027.50
Engineering and contingencies, 5 per cent	2,301.38
Total	48,328.88

16-FOOT ROADBED.

29,490 cubic yards earth, at 50 cents	14,745.00
4,000 cubic yards retaining wall, at $1	4,000.00
13,030 cubic yards loose rock, at $1	13,030.00
6,895 cubic yards solid rock, at $2	13,790.00
22 acres clearing, at $250	5,500.00
One 30-foot bridge (rough logs)	500.00
	51,565.00
Engineering and contingencies, 5 per cent	2,578.25
Total	54,143.25

The above estimates and figures include all spur roads to new points. The notebooks on transit work, level work, and side slopes, together with the map of the road on a scale of 100 feet to 1 inch and 5 foot contour intervals, also a profile map, will be submitted when completed.

(2) Another proposed road is from the power house via Merced Canyon, Vernal and Nevada Falls, thence via Illilouette Falls to Glacier Point. (See Appendix A in annual report of the acting superintendent Yosemite National Park for 1908.) The proposed route has been carefully examined and it is believed that surveys would be necessary only for the portion of the road from Nevada Falls to Glacier Point, and then these surveys need be only very rough.

(3) From Mirror Lake to Lake Tenaya would be another location for a new road. This road would place within a 12-mile drive the largest lake in Yosemite National Park with the exception of Lake Eleanor.

(4) A road from the Hog Ranch to the Hetch Hetchy Valley would make it possible for people to drive from Yosemite into the Hetch Hetchy. No survey has been made for this road nor has the writer had an opportunity to examine the ground.

TRAILS.

The existing trails in the little-traveled country away from Yosemite Valley are all of rough but serviceable construction and entirely adequate for the travel they must bear. The trails leading from the floor of the valley to the rim can all be greatly improved by lengthening the zigzags and easing the grades. In a great many places the original builders had plenty of room to put in longer but easier trails. A lack of funds caused steep and short trails to be built. An expenditure of about $8,000 on each of the three main trails leading from the valley floor to the rim is recommended for widening and easing grades.

For proposed new trails, see annual report of the acting superintendent of the Yosemite National Park for the year 1908.

BRIDGES.

There are at present on the floor of the valley crossing the Merced and Tenaya rivers the following bridges:

Pohono Bridge (steel), 100 feet.
Sentinel Hotel Bridge (steel), 96 feet.
El Capitan Bridge (wood), 100 feet.
Stoneman Bridge (wood), 92 feet.
Upper Bridge (wood), 100 feet.
Power House Bridge (wood), 86 feet.
Tenaya Creek Bridge (wood), 85 feet.

These bridges, with the exception of the Pohono Bridge, will all need to be replaced in a very few years. It is recommended that stone arch bridges be put in place of the existing structures. A stone bridge would be practically indestructible and would be both appropriate and beautiful, and would also be an adequate monument to represent the American Government in architectural work in its national park. Perhaps 50 per cent of all the visitors here are strangers and no doubt

they remark on the existing poor roads and bridges, so different from those seen in foreign parks. Stone arch bridges should not cost more than $18,000 for 100-foot span. Quite a number of smaller bridges in the park could also be replaced by stone arch structures.

POWER AND WATER SYSTEM.

At the present date reconstruction work in conformity to a plan presented by Mr. M. O. Leighton, chief hydrographer, United States Geological Survey, is being executed. (The proposed new power and light system is described in Mr. Leighton's report in the appendix to the annual report of the acting superintendent of Yosemite National Park for 1908.)

BUILDINGS.

The erection of an office building with an adequate office for the engineer officer is recommended.

In the estimates for a water-sprinkling system for the El Portal road no item for stables for horses, etc., was included. The following is estimated for such stables and shelter houses:

Three shelters for horses, with barns, and also way-station houses for repair-road gangs, at $1,500 each, $4,500; one powder house for dynamite storage, $500; total, $5,000.

Very respectfully,

A. R. Ehrnbeck,
First Lieutenant, Corps of Engineers,
Yosemite National Park.

The Superintendent Yosemite National Park.

APPENDIX B.

RULES AND REGULATIONS.

Regulations of June 1, 1909.

The following rules and regulations for the government of the Yosemite National Park, including the Yosemite Valley and Mariposa Big Tree Grove, are hereby established and made public, pursuant to authority conferred by the acts of Congress approved October 1, 1890, February 7, 1905, and June 11, 1906:

1. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the government lands within the park.

2. It is forbidden to cut or injure any timber growing on the park lands, or to deface or injure any government property. Camping parties will be allowed to use dead or fallen timber for fuel. When felling timber, stumps must not be left higher than 12 inches from the ground.

3. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof. On arrival at the first station of the park guard, parties having firearms, traps, nets, seines, or explosives, will turn them over to the sergeant in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the park.

5. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

6. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the government lands in the park without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

7. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; such lands, however, shall have the metes and bounds thereof so marked and defined that they may be readily distinguished from the park lands. Stock may be taken over the park lands to patented lands with the written permission and under the supervision of the superintendent.

8. The herding or grazing of loose stock or cattle of any kind on the government lands in the park, as well as the driving of such stock or cattle over the same, is strictly forbidden, except in such cases where authority therefor is granted by the superintendent.

9. No drinking saloon or barroom will be permitted upon government lands in the park.

10. Private notices or advertisements shall not be posted or displayed on the government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

11. It is forbidden to carve or write names or otherwise deface any of the posts, signboards, platforms, seats, railings, steps, bowlders, trees, or structures of any kind in the park.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the government lands in the park and enforce these rules and regulations and all the provisions of the acts of Congress aforesaid.

INSTRUCTIONS OF JUNE 1, 1909.

(1) Interference with or molestation of any bear or other wild animal in the park in any way by any person not authorized by the superintendent is prohibited.

(2) *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth well packed down. Care should be taken that no lighted match, cigar, or cigarette is dropped in any grass, twigs, leaves, or tree mold.

(3) *Camps.*—No camp will be made except at designated localities. All campers in Yosemite Valley shall first report at the office of the superintendent for assignment to camping sites, and will not change camps without permission, nor shall fires be lighted in Yosemite Valley or Mariposa Big Tree Grove without the express permission of the superintendent. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung near the road. The same rule applies to temporary stops, such as for feeding horses or for taking luncheon.

Many successive parties camp on the same sites during the season, and camp grounds must be thoroughly cleaned before they are abandoned. Tin cans must be flattened and, with bottles, cast-off clothing, and all other débris, must be deposited in a pit provided for the purpose. When camps are made in unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive to the eye.

(4) *Bicycles.*—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curve. In passing a team from the rear, the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

(5) *Fishing.*—All fish less than 6 inches in length should at once be returned to the water with the least damage possible to the fish. No one person shall catch more than fifty fish in one day.

(6) *Dogs.*—Dogs are not permitted in the park.

(7) *Stages.*—Stages entering Yosemite Valley shall stop at each hotel or permanent camp in the order of location, so that passengers may exercise the right of selection.

(8) *Driving on roads of park.*—(*a*) Drivers of vehicles of any description, when overtaken by other vehicles traveling at a faster rate of speed, shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(*b*) Vehicles, in passing each other, must give full half of the roadway. This applies to freight outfits as well as any other.

(*c*) Freight, baggage, and heavy camping outfits on sidehill grades throughout the park will take the outer side of the road while being passed by passenger vehicles in either direction.

(*d*) Transportation companies, freight and wood contractors, and all other parties and persons using the park roads will be held liable for violations of these instructions.

(*e*) Mounted men on meeting a passenger team on a grade will halt on the outer side until the team passes. When approaching a passenger team from the rear warning must be given, and no faster gait will be taken than is necessary to make the passage, and if on a grade the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

(*f*) All wagons used in hauling heavy freight over the park roads must have tires not less than 4 inches in width. This order does not apply to express freight hauled in light spring wagons with single teams.

(9) *Miscellaneous.*—Automobiles and motor cycles are not permitted in the park.

No person shall ride or drive faster than a walk over any of the government bridges within the park. Riding or driving at night, except on the floor of the Yosemite Valley, is forbidden.

Persons with animals using trails must keep therein; leaving the trails for the purpose of making short cuts will not be permitted.

Persons are not allowed to bathe near any of the regularly traveled roads in the park without suitable bathing clothes.

Campers and all others, save those holding license from the Secretary of the Interior, are prohibited from hiring their horses, trappings, or vehicles to tourists or visitors in the park.

All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent in writing before the complainant leaves the park.

(10) The penalty for disregard of these instructions is summary ejection from the park.

Regulations of February 29, 1908, Governing the Impounding and Disposition of Loose Live Stock.

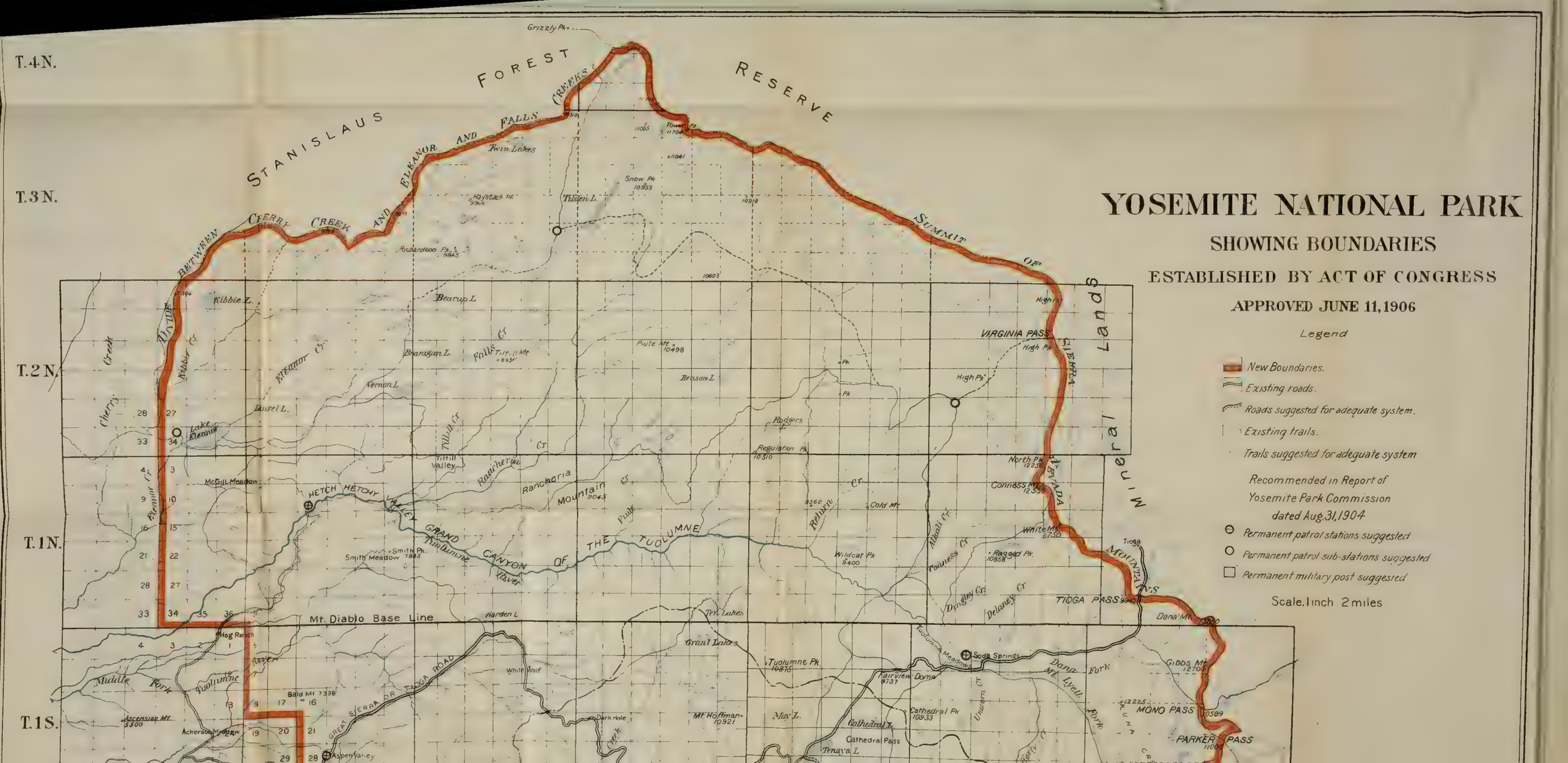
Horses, cattle, or other domestic live stock running at large or being herded or grazed in the Yosemite National Park without authority from the Secretary of the Interior will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notice of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same

upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within thirty days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after ten days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale such proceeds shall be turned into the Yosemite National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.


T.4N.
T.3N.
T.2N.
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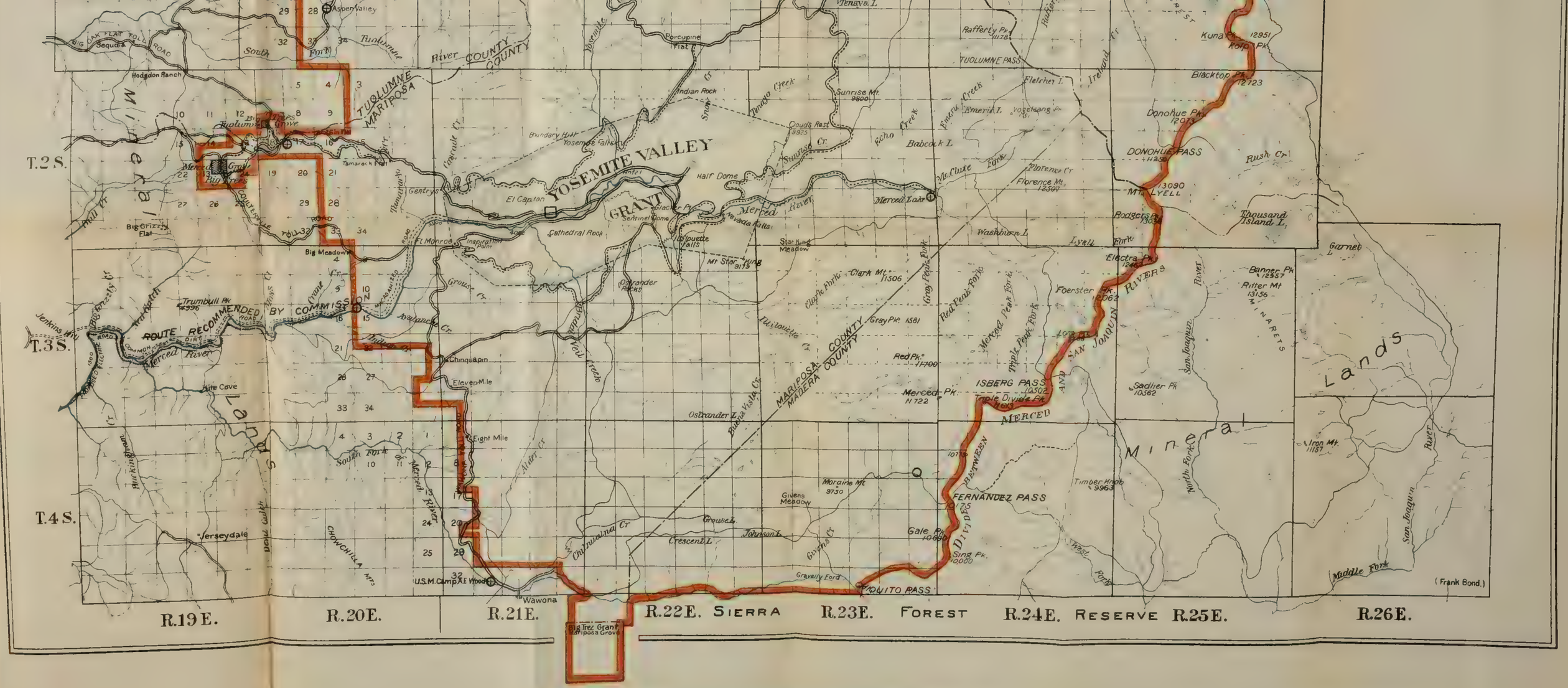
T.1S.
FOREST RESERVE
STANISLAUS AND ELEANOR AND FALLS CREEKS
BETWEEN CHERRY CREEK AND DIVIDE
SUMMIT OF Mineral Lands SIERRA NEVADA
YOSEMITE NATIONAL PARK
SHOWING BOUNDARIES
ESTABLISHED BY ACT OF CONGRESS
APPROVED JUNE 11, 1906
Legend
New Boundaries.
Existing roads.
Roads suggested for adequate system.
Existing trails.
Trails suggested for adequate system
Recommended in Report of Yosemite Park Commission dated Aug. 31, 1904
Permanent patrol stations suggested
Permanent patrol sub-stations suggested
Permanent military post suggested
Scale, 1 inch 2 miles
Mt. Diablo Base Line
HETCH HETCHY VALLEY
GRAND CANYON OF THE TUOLUMNE
TIOGA PASS
MONO PASS
PARKER PASS
VIRGINIA PASS
Lake Eleanor
McGill Meadow
Smith Meadow
Hog Ranch
Aspen Valley
Soda Springs
Tuolumne Meadows
Grant Lakes
Ten Lakes
Harden L.
Tenaya L.
Cathedral Pass
Mt. Hoffman
Fairview Dome
Cathedral Pk.
Tuolumne Pk.
Grizzly Pk.
Tower Pk.
Twin Lakes
Tilden L.
Snow Pk.
Haystack Pk.
Richardson Pk.
Ribbie L.
Bearup L.
Brannigan L.
Vernon L.
Laurel L.
Triple Falls
Triple Falls Mt.
Piute Mt.
Benson L.
Rodgers
Regulation Pk.
Trilliums Valley
Rancheria Mountain
Smith Pk.
Wildcat Pk.
Cold Mt.
Return
Conness Mt.
North Pk.
White Mt.
Ragged Pk.
Dana Mt.
Gibbs Mt.
Lyell Fork
Dana Fork
Unicorn Cr.
Delaney Cr.
Tioga
Ascensian Mt.
Ackerson Meadow
Bald Mt.
White Wolf
Dark Hole
Max L.
Middle Fork Tuolumne
Cherry Creek
Ribbie Cr.
Eleanor Cr.
Tilden Cr.
Rancheria Cr.
Return Cr.
Tuolumne River
GREAT SIERRA DR TIOGA ROAD


TUOLUMNE COUNTY
MARIPOSA COUNTY
MADERA COUNTY
YOSEMITE VALLEY
GRANT
TUOLUMNE
MARIPOSA
ROUTE RECOMMENDED BY COMMISSION
Merced River
Tuolumne River
South Fork
Middle Fork
San Joaquin River
MERCED AND SAN JOAQUIN RIVERS
Hodgdon Ranch
Aspen Valley
Big Oak Flat Road
Big Trees Grant
Big Meadows
Big Grizzly Flat
Trumbull Pk 12396
Jenkins Mtn
Pine Cove
Jerseydale
Eleven Mile
Eight Mile
Chinquapin
Inspiration Point
El Capitan
Cathedral Rock
Sentinel Dome
Half Dome
Nevada Falls
Vernal Falls
Mt Starr King 8173
Clouds Rest 9925
Sunrise Mt 9800
Indian Rock
Tenaya L
Porcupine Flat
Rafferty Pk 11128
TUOLUMNE PASS
Kuna Pk 12951
Kuna Pk
Blacktop Pk 12723
Donohue Pk 12073
DONOHUE PASS +11298
Mt LYELL 13090
Rodgers Pk 13074
Thousand Island L
Florence Mt 12509
Florence Cr
Rush Cr
Babcock L
Merced Lake
McClure Fork
Washburn L
Lyell Fork
Electra Pk 12452
Foerster Pk 12062
Banner Pk 12957
Ritter Mt 13156
MINARETS
Garnet L
Clark Mt 11506
Gray Pk 1581
Red Pk 11700
Merced Pk N 722
Sadlier Pk 10562
ISBERG PASS 10502
Triple Divide Pk 10613
Timber Knob 9963
Iron Mt 11187
North Fork
Lands
Mineral
Forest Reserve
Ostrander Rocks
Ostrander L
Moraine Mt 9750
Givens Meadow
Crescent L
Johnson L
Gale Pk 10650
Sing Pk 10000
FERNANDEZ PASS
DIVIDE
MARIPOSA
Gravelly Ford
KIQUITO PASS
Wawona
U.S.M. Camp R.E. Wood
Big Trees Grant Mariposa Grove
Chowchilla Mts
Deer Creek
Alder Cr
Chilnualna Cr
Buena Vista Cr
Bridalveil Cr
Yosemite Falls
Boundary Hill
Tamarack Flat
Coulterville
Gentrys
Foresta
El Portal
Greeley Hill
Jenkins Hill
Hill Cr
Smith Cr
Granite Cr
Snow Cr
Tenaya Creek
Echo Creek
Emeric L
Fletcher L
Vogelsang Pk
Ireland Cr
Rancheria Mtn
Aurora Cr
Avalanche Cr
Grouse Cr
Triple Peak Fork
Red Peak Fork
Gray Peak Fork
Lyell Fork
Twilight Cr
Merced Peak Fork
Lake Fk
Garnet L
Iron Mt
Middle Fork
San Joaquin River
(Frank Bond.)
T.2 S.
T.3 S.
T.4 S.
R.19 E.
R.20 E.
R.21 E.
R.22 E.
R.23 E.
R.24 E.
R.25 E.
R.26 E.

REPORT OF THE ACTING SUPERINTENDENT OF THE SEQUOIA AND GENERAL GRANT NATIONAL PARKS.

REPORT OF THE ACTING SUPERINTENDENT OF THE SEQUOIA AND GENERAL GRANT NATIONAL PARKS.

OFFICE OF THE ACTING SUPERINTENDENT,
CAMP SEQUOIA, CAL.,
September 1, 1909.

SIR: I have the honor to submit a report relative to the condition of affairs in and the management of the Sequoia and General Grant National Parks during the season of 1909.

SEQUOIA NATIONAL PARK.

Sequoia Park is located in Tulare County, Cal., and has an area of about 250 square miles, or 161,597 acres; it lies 300 miles southeast of San Francisco, and may be reached via the Southern Pacific Railroad to Visalia; thence via the Visalia Electric Railway Company to Lemon Cove, and by stage from that point to the Giant Forest, the Mecca of all visitors who come to see the "big trees." The park was set aside by the act of September 25, 1890 (26 Stat., 478), supplemented by the act of October 1, 1890 (26 Stat., 650), and placed under the control of the Secretary of the Interior.

The above area comprises approximately 87,160 acres of magnificent merchantable timber, 57,768 acres of woodland (firewood), 5,760 acres of grass land, and 9,312 acres of desert land. The local names of lumber trees in the order of predominance are white fir, sugar pine, yellow pine, sequoia, Jeffry pine, red fir, cedar, foxtail pine, silver pine, white pine, and juniper; of firewood trees, oak, juniper, willow, cottonwood, red alder, sycamore, maple, ash, white pine, mahogany, red bud, false elm, nutmeg, laurel, and buckeye. The average number of board feet per acre in the merchantable timber is 32,000 and each acre of woodland is estimated to produce 22 cords of wood.

In addition to the interesting points shown on the tabulated statement with this report there are many places of note outside the park, among which may be mentioned the Kern and Kings River canyons, Farewell Gap, Mount Vanderver, Mineral King, Sawtooth Peak, and Moose Lake. Inside the park, but not yet accessible by either road or trail, are many places which one given to exploring would be glad to visit, such as Big Baldy, Little Baldy, Castle Rocks, Mount Silliman, Marble Cave, Panther Creek, Dennison Mountain, Homers Nose, and others.

GENERAL GRANT NATIONAL PARK.

This park, which lies northwest of Sequoia Park, one-half in Tulare County and the other half in Fresno County, Cal., has an area of about 4 square miles, or 2,536 acres. The distance from Camp Sequoia, in Sequoia National Park, to the ranger's cabin, in the center of General Grant National Park, is 33 miles, but the distance between the boundaries of the two reservations is probably not more than 8 miles by trail. The park is 60 miles from Visalia, on both the Southern Pacific and

Santa Fe lines, and is best reached by wagon road from Sanger, on the Southern Pacific Railroad. The main attraction is the grove of great sequoia trees, including the "General Grant," which is surpassed in size only by the "General Sherman" tree, in Sequoia Park, and on account of its accessibility has become the favorite camping place in summer of many people of the San Joaquin Valley.

The park was set aside by the act of October 1, 1890 (26 Stat., 650), and placed under the control of the Secretary of the Interior in the same manner as Sequoia Park.

GUARDING THE PARKS.

Upon the request of the Secretary of the Interior to the War Department, and pursuant to G. O., No. 40, Headquarters Department of California, March 8, 1909, Troop G, Fourteenth Cavalry, with medical officer and hospital corps detachment (3 officers and 66 enlisted men), left the Presidio of San Francisco on April 20, 1909, en route for the Sequoia National Park, reached Three Rivers on May 7, and the march was resumed again on May 10 to this camp, where the command arrived May 11.

Owing to the great fall of snow in the winter of 1908–9 it was not practicable to get out outposts till the middle of June. Even though weather conditions did not prohibit the sending out of outposts until June 15, I would recommend that they be not detached from the troop until this date, as tourists do not come in before July 1, and during the month from the arrival of the troop in the park until June 15 the commanding officer and acting superintendent can intelligently come to a conclusion where it is best to have outposts, and he thus has also ample time to get in his supplies and establish a good, comfortable, and efficient main camp.

The same outposts were occupied this year as last, with the exception of Buck Canyon, which was abandoned on account of the great amount of snow there during most of the season.

The outposts were changed once a month, in order to give the men a knowledge of the country and to eliminate, as much as possible, the element of sameness from the work.

The duty of the troops is to preserve and protect the trees, plants, birds, animals, fishes, mineral deposits, and natural curiosities, to prevent forest fires and the unauthorized use of government lands by trespassers and by cattle and sheep. Firearms are permitted in the reservations only by written permission of the superintendent, and must be sealed, except those of the troops and rangers. Particular attention is paid to seeing that fires of camping parties are completely extinguished when camps are vacated. Trespassers and persons who misbehave, or who fail to observe the rules and regulations, are summarily ejected from the parks.

GENERAL CONDITIONS.

The present season was one of much snow, so that tourists did not begin to arrive until about July 1. It may be stated that the tourist season is from July 1 to September 1, and that after September 1 there is no further need for troops in the parks.

Prior to July 1 all camp sites should be cleaned up, and this can very well be done by the road and trail repairers, who always open up the thoroughfares before the arrival of the troops.

Before the tourists enter next season signs should be put along the roads ordering that all horse manure, old straw, cast-off clothing, kitchen refuse, etc., be either buried or thrown over the grade when the camp site has been used. This season many tourists left unsightly and insanitary camps at the stopping places between Rocky Gulch and Colony Mill, on the Giant Forest road, and from experience with the class of people who most frequent these parks the undersigned is inclined to believe it is rather from ignorance or carelessness than a desire to directly disregard any rule or regulation, that they fail to clean up the camps which they use for one night.

The recommendation of last year is again renewed: That a contingent fund be put in the hands of the acting superintendent for the temporary employment of men to clean up paper, lunch boxes, bottles, etc., of travelers and picnicking parties along roads, trails, and at points of interest.

PARK REGULATIONS.

Regulations in general are lived up to, but it is quite difficult to enforce the sanitary rules, and campers and tourists must be constantly warned. One man came to the Giant Forest this year, and when told by the ranger to dig a pit for his kitchen garbage, hitched up his horses and left, saying: "I come to the mountains for rest; not to dig holes." This is the attitude of numbers of people who do not care to receive instructions from rangers or soldiers. One woman told me when admonished about throwing all dishwater, bath water, and hands-and-face water into a pit and covering same every day, that she used this water for watering flowers that were growing in an inclosure in front of her tent. When told that this was dangerous to health, and why it was dangerous, she seemed to have learned something.

Sanitary rules and regulations at Camp Sierra, where there were at one time some 200 persons, were enforced by the post surgeon, Captain Tefft, assisted by Ranger Grunigen, and the camp was always clean and in first-class sanitary condition, the sinks for latrines and kitchen garbage being made fly proof with box and board covered tops. The detachment at Grant Park and the ranger there had the same clean camp that obtained at the big camping place in the Giant Forest.

FOREST FIRES.

This season there were no fires during the time the troops were in the parks.

GAME.

Game, from all indications, seems to be more plentiful this season than usual. Many deer have been seen in and about Camp Sequoia and Camp Sierra, and they are remarkably gentle, several photographs of them having been taken. One reason for so many being seen around the camps this year, no doubt, is due to mountain lions, which, from tracks seen along the roads, are numerous. I would again recommend that a pack of hounds be purchased and trained to do away with mountain lions, lynx, and wild cats. Good dogs can be trained to track the foregoing animals and not bother deer.

I believe that dogs constitute the only means for solving the problem of the diminution of lions and other animals of the cat tribe

in these parks, for they are too wary to take poisoned bait, and eat only what they kill. These animals always take their prey by surprise, and are admirably fitted to pursue and avoid pursuit excepting by good dogs. The great difficulty in hunting them by ordinary methods lies in the fact that they seldom go from their lairs by day. Often when gorged on a deer they lie for three or four days without seeking food or drink.

Deer are usually killed from ambush, the marauders springing from trees and bearing them to the ground, then biting through the spine and ripping their bodies with powerful claws. Deer are sometimes pursued in the open, and when this happens they have no chance with the fleet-footed cat.

Bear were very numerous this year, and even bothersome—they entered provision receptacles wherever they could, and frequently frightened women, children, and stock; and the frightening of horses and mules is dangerous particularly so at some of the grades on the Giant Forest road. I appreciate that there is a good deal of sentiment about protecting bears, but whether their protection is a wise thing, it seems to me, is questionable.

Quail and grouse are more numerous this year than usual, and animals of the rodent kind have not diminished any in numbers.

The elk in the elk park are quite wild and not often seen. Spoor encountered indicate that they are in the park, but whether on the increase or not no one seems to know positively.

It is again recommended that a herd of buffalo be put into that section of the Sequoia Park known as "Elk Park."

The California condor, a very rare bird, which lives in the crags at the highest points of the Sierras, is said to frequent the high peaks in the Sequoia Park. How rare this bird is can be judged by the fact that its egg is quoted at $1,000.

The British in Canada have established a great game preserve known as Goat Mountain Park, where mountain goats, sheep, elk, buffalo, etc., are bred. I know of no better place for this Government to follow this example than the Sequoia Park, and would recommend that steps be taken to make this park a great game preserve as well as a national pleasure ground.

Last year several game preserves were set aside in the United States for particular animals, viz, the Montana National Bison Range and the Superior National Forest and Game Preserve in Minnesota. The Sequoia National Park is the equal of either of them for the propagation of game.

FISH AND FISHING.

Fishing this year was better than usual, and from the numbers brought into camp it is judged that it will be good for some time to come, even though no more fish are planted. However, if the fish can be gotten they should be planted.

DRIVING LIVE STOCK THROUGH PARKS.

This year several herds have passed through the Sequoia Park under proper authority. They all went over the Mineral King road from west to east to grazing lands beyond the eastern park line, and so far as is known the owners and herders have complied with all park requirements.

THE BIG TREES.

The big trees rank first among the natural features of the parks; they are found only in the south-central portion of California, and grow in peculiar red soil at an altitude of from 5,000 to 7,500 feet, varying in size, according to age, from saplings to trees with a diameter of 36 feet, and are sometimes 300 feet in height. They are fitted by nature for almost everlasting life and are remarkably tenacious of existence; many may be seen burned almost through at the base and still flourishing at the top.

There is a good deal of contention, especially among Californians, as to where the biggest tree in the State is, some championing the Grizzly Giant, in the Yosemite Park; others the General Sherman, in Sequoia Park. I know three people reputable for veracity who have seen both, and all say without hesitation that the General Sherman is the larger. This tree is 36 feet in diameter 6 feet above the ground and 20 feet in diameter 100 feet above the ground. In the Giant Forest, where the General Sherman Tree is, there are 5,000 trees over 15 feet in diameter, and a half a million trees all told. There are five other groves in the Sequoia Park and one in General Grant Park.

POINTS OF INTEREST.

In the following table are given the principal points of interest, including distances, directions, and manner of reaching from the Giant Forest:

Table showing points of interest in the Sequoia and General Grant national parks.

Name.	Distance from Giant Forest.	Direction from Giant Forest.	Road or trail.	Altitude.	Best means of reaching.	Remarks.
	Miles.			*Feet.*		
Camp Sequoia	4	SW.	Road	5,000	Horse or wagon.	Camp of United States troops.
Moro Rock	2	SE.	do	6,719	do	Magnificent view.
Crescent Meadow	1½	SE.	Trail	6,500	Horse	Pretty mountain meadow; good camping place.
Log Meadow	1¼	SE.	do	7,116	do	Huge log once used as hunter's cabin; also chimney tree; good camping place.
Circle Meadow	1	E.	do	6,700	do	Huge hollow fallen log, 174 feet long, which can be walked through; also Wolverton's house tree; good camping place.
Long Meadow	3	NE.	do	8,000	do	Pretty mountain meadow; good camping place.
Sherman Tree	2	NE.	do	7,210	do	Largest tree in the world—118 feet in circumference, 36 feet in diameter and 280 feet high.
Admiration Point	8	W.	Road and trail.	4,600	do	Beautiful scenery; precipitous cliff (2,029 feet) can be looked over.
Marble Fork Bridge.	4	W.	Road	5,000	Wagon	Fine mountain stream and bridge; good place for picnicking and bathing; fair fishing; good camping place; camp of United States troops.
Marble Fork (Twin Lakes Trail Crossing.)	6	NE.	Trail	6,719	Trail	Beautiful scenery; good place for picnicking; fair fishing; good camping place.
Wolvertons Cabin	6	NE.	do	7,500	Horse	Bowlder and log cabin used by old trapper and hunter named Wolverton prior to creation of park by Congress; fair fishing; good camping place.
Cahoon Meadow	10	NE.	do	8,200	do	Fine mountain meadow; excellent place for outing, as wood, grass, etc., are abundant; good camping place.

Table showing points of interest in the Sequoia and General Grant national parks—Con.

Name.	Distance from Giant Forest.	Direction from Giant Forest.	Road or trail.	Altitude.	Best means of reaching.	Remarks.
	Miles.			*Feet.*		
Twin Lakes	13	NE.	Trail	9,000	Horse	Deep mountain lake situated in granite pocket; one of the most interesting and beautiful sights in Sequoia Park; good camping place.
Alta Peak	10	E.	do	11,211	Horse and foot.	From this peak a better panoramic view may be obtained of the terrain of the Sequoia Park than from any other height.
Alta Meadow	9	E.	do	9,000	Horse	Fine scenery and good picnic grounds; good camping place.
Buck Canyon	10	SE.	do	4,200	do	Deep mountain gorge; a fit place for mountaineers only to visit, as it is in extremely rough country.
Halstead Meadow	10	NW.	do	8,400	do	Fine mountain meadow; good place for outing; is on the route between Giant Forest road and General Grant Park; fair fishing; good camping place.
Dorst Creek	12	NW.	do	6,500	do	Fine mountain stream, 3 miles from magnificent sequoia grove; good camping place.
Stony Creek	14½	NW.	do	6,500	do	Pretty mountain stream, with good, though small, grazing meadows in vicinity; good fishing; good camping place.
Bear Trap Meadow	16¼	NW.	do	7,000	do	Fine meadow named from old log bear trap, which is still standing; good fishing; good camping place.
General Grant Park	29	NW.	do	6,600	do	Contains the General Grant tree, one of the largest in the world, also the Fallen Monarch and others of interest; good camping place.
Paradise Cave	25	SW.	Road and trail.	5,800	Horse or wagon.	Large cave not yet fully explored; contains many features full of interest, and very beautiful.
Oriole Lake	25	S.	do	5,700	do	Small, deep mountain lake surrounded by beautiful forest; fair fishing; good camping place.
Clough's Cave	44	S.	do	4,300	Horse	Interesting cave near camp of detachment of United States troops; fine, large spring of water at the camp; fair fishing; good camping place.
Hocketts Meadow	56	SE.	Trail	,500	do	Fine mountain meadow, headquarters of park ranger; Hocketts Lake, Sand Meadow, and Mitchells Meadow in immediate vicinity; excellent fishing; good camping place.
Lake Evelyn	56	SE.	do	8,000	do	Deep mountain lake, 3 miles from Hocketts Meadow; contains some very large trout; fair fishing; good camping place.
Cabin Meadow	56	SE.	Road and trail.	8,750	do	Beautiful meadow halfway between Hocketts Meadow and Quinns Horse Camp; excellent fishing; good camping place.
Quinns Horse Camp.	64	SE.	do	8,500	do	Headquarters of park ranger; fine soda springs 1 mile from cabin; lemonade of water from these springs tastes as though made of Apollinaris water; excellent fishing; good camping place.
Elk Park	15	S.	do	2,000	do	Section of Sequoia Park set aside for herd of elk, where these animals wander about undisturbed; excellent fishing; good camping place.
Hospital Rock	19	S.	do	3,000	do	Huge rock supposed to have been occupied by a prehistoric race; numerous hieroglyphics painted on it; good fishing; good camping place.
Atwells Mill	30	SE.	Trail	6,500	do	Small settlement and mill near camp of detachment of United States troops; some huge sequoia stumps may be seen where trees were cut prior to creation of park; fair fishing; good camping place.

PATENTED LANDS.

On this question I have only the same recommendation to make as was made last year: That Congress appropriate a sufficient sum of money for the purchase of all private holdings in Sequoia and General Grant National parks.

HEADQUARTERS CAMP.

In my report of last year I stated that the Marble Fork was the proper place for headquarters camp, and gave reasons. My command camped at that site this year, and I am now more convinced than ever that it is the right place for a camp for administration of park affairs.

Several military inspectors (4) visited the camp this year, and all agree that the Marble Fork is the place for the headquarters camp.

The one drawback to the site is that part of the camp is on patented land, but this might be used as a further argument for the purchase of all private holdings, or at least this particular piece of land for the use of the military.

Owing to great amount of dust occasioned by travel in the mountains it is recommended that about $500 be appropriated for oil for the grounds around the camp, and on the road for at least one half mile on either side. The Inspector-General made such recommendation this year in his military report.

MILITARY POST.

I again urge, for the sake of health, comfort, economy, and administrative purposes, that neat, inexpensive frame buildings (log-cabin style would be better, as the material could be cut close at hand) should be built for the troops on the Marble Fork of the Kaweah River at the point which I have favored for the headquarters camp. These buildings should include quarters for officers and men, latrines, stables (sheds) for troop and quartermaster's stock, storehouses, bath houses, and administration, bakery, and post exchange buildings.

Lieut. Col. C. G. Woodward, Inspector-General, U. S. Army, recommended in his report this year that such buildings be constructed.

POST-OFFICE.

The post-office at Ranger, it is recommended, be not reestablished next year, but, as urged in last year's report, it should be at the military camp. Ranger, or Camp Sierra, as it is more frequently called, is not nearly so important as the camp of the troops, nor is as much mail handled as at Camp Sequoia.

ACCOMMODATIONS.

This season there was no hotel or hotel camp at the old site which was run by Broder and Hopping last year, though several parties (whom I had every reason to believe could not run a first-class place) applied for the hotel privilege, but were denied the same.

I am of the same opinion now as I was at the beginning of the season—that no concessions be given for hotel unless a first-class establishment can be run.

Many people camped on their own account at the old Broder and Hopping site this year, and by the enforcement of the sanitary regulations, by a daily visit of the post surgeon, were much better off, and so expressed themselves, than they were last year with the firm of Broder and Hopping.

TOURISTS.

There were not so many tourists this year as last; this is accounted for by the unusually cool summer in this section, and no hotel accommodations in the park.

There were about 854 tourists in Sequoia Park and 798 in General Grant Park.

ROADS, TRAILS, ETC.

As stated in the report of 1908 the Giant Forest and Mineral King roads admit of improvement by widening.

No work was done on trails this year, as the whole appropriation was put into the new road being built from the Camp Sequoia (headquarters camp) of last year to join the Mount Whitney Power Company's road near power camp No. 3. When this road is completed there will then be a circuitous thoroughfare through the Sequoia Park, and the distance between Three Rivers and the Giant Forest will be diminished by 12 or more miles. The scenery along this route will also be magnificent.

It is recommended that all the money allotted for improvements next year, excepting enough to keep the telephone line in repair, be expended on the above road, and that no other improvements in the way of roads and trails be started until this work is finished, even though it take two or three years to do so.

As "Roads and trails" is the heading under which this year's improvements are shown in Sequoia Park, I here make note of the year's improvements in General Grant Park. The improvements in this little park consisted of the building of seven large double latrines and seven large and deep fly-proof kitchen-refuse sinks or pits. Latrines were also built on the Giant Forest and Mineral King roads in Sequoia Park.

TELEPHONE LINES.

This year telephonic communication was established with General Grant Park, and it is here proper to extend thanks to the Forest Service for its kindness in allowing the use of its line up to where the Interior Department built into the park.

About 16 miles of line has been built this year, connecting all outposts with main camp except the one at Atwell's mill, which should be completed next season. A telephone booth was put up between Cold Springs and Atwell's mill.

PARK RANGERS.

The park rangers, Messrs. Walter Fry, C. W. Blossom, H. T. Britten, and L. L. Davis, are intelligent, loyal, and faithful men, performing well the duties required of them.

For the same reasons given in my last year's report, I am of opinion that these men should receive an increase in pay. If it is not seen

fit to do this, each ranger should be furnished forage for two horses by the Government, and horse corrals should be built at all the ranger cabins which are in fine mountain meadows.

MOUNT WHITNEY POWER COMPANY.

Now that the road has been started from old Camp Sequoia to connect with the Mount Whitney Power Company's road in Sequoia Park, steps should be taken to have this company put a large force on its road building, which for the last couple years has been moving along very slowly.

SANITARY RULES.

The following rules regarding sanitation were issued:

CAMP SITES.

In selecting a camping ground it should be at a sufficient distance from the water source, stream, or spring not to be objectionable to those who may wish to camp in the neighborhood and use the same water source at the same time.

DISPOSAL OF KITCHEN REFUSE AND OTHER WASTE.

Kitchen refuse, cans, vegetable parings and tops, bones, soiled and cast-off wearing apparel, boxes, paper, etc., should be buried or burned.

A pit at least 3 feet deep and of sufficient size to accommodate all such waste material must be dug, and the daily quantity of material kept covered with earth in order that flies and an odor may not be present. The pit must be covered with earth to the surface level on the abandonment of the camping ground.

WATER SOURCE.

The washing of linen, bathing, or the casting of any objectionable material, such as cans, linen, soap, vegetables, or fruit coverings, etc., into a spring or water source or about its margins, which is used either in the immediate vicinity or below for human consumption, as well as the watering of animals above any camping site, is strictly prohibited.

ANIMALS.

All animals should be kept a sufficient distance from camping grounds not to litter the ground and make unfit for use the area which may be later used as tent sites. Animals should not be tethered near to or in the bed of any stream or spring, whether the same is running or dry. All animals must be watered below all camps adjacent to such stream or spring. Dogs must be kept tied and not allowed to swim in or otherwise contaminate the stream along which campers may be living. The placing of animal refuse or manure on camping or possible camping sites adjacent to streams or springs, or their dry runs, or on roads, is strictly forbidden. Dead animals must be buried at least one-fourth of a mile from the camping sites and at a sufficient depth not to be uncovered by bears and other animals.

LATRINES, SINKS, PRIVIES.

It is forbidden for anyone to soil or in any way write upon or mutilate any of the structures erected for public convenience. In places where such structures are not provided campers must make pits or sinks, in size 2 by 3 by 3 feet deep (larger and deeper if the number of individuals requires) and keep same covered daily with dry earth to prevent odor and presence of flies. These sinks must be well outside of individual and camp sites and a considerable distance from streams and springs, and on abandonment of the camp must be covered entirely with earth to at least the level of the surrounding surface.

ABANDONMENT OF CAMP.

On abandoning a camp all pits must be filled and all camp and kitchen refuse, as mentioned above, buried or burned and the ground left free from all objectionable material, to the end that the site may be suitable for future pleasure seekers.

Troopers and rangers are instructed to see that these rules are strictly enforced.

ESTIMATES FOR FISCAL YEAR 1911.

Sequoia National Park.—It is recommended that the salaries for the rangers and $1,000 for telephone work be subtracted from the general appropriation of $15,550 and that the remainder be put on the new road started this year.

General Grant National Park.—Salary of one park ranger, $1,200, and $1,500 for a pipe line for benefit of campers—total, $2,700.

CONCLUSION.

The season of 1909 was profitable and pleasant, because it was cooler. There were no forest fires to fight, the camp was much better equipped than last year and much better situated, the men from their experience of last year were better up to their work, and all officers, soldiers, and rangers did well what was required of them.

My thanks are especially due to Capt. W. H. Tefft, Medical Corps, U. S. Army, Lieut. T. H. Bane, Fourteenth Cavalry, and Chief Park Ranger Mr. Walter Fry for loyal, cheerful, and efficient work. Sergt. C. O. McKinney, as clerk in the office of the acting superintendent, did most excellent work, and I tender my appreciation and thanks for same.

Very respectfully,

C. C. Smith,
Captain, Fourteenth Cavalry,
Acting Superintendent Sequoia and General Grant National Parks.

The Secretary of the Interior.

RULES AND REGULATIONS.

SEQUOIA NATIONAL PARK.

GENERAL REGULATIONS OF MARCH 30, 1907.

1. By the act of Congress approved September 25, 1890, the tract of land in the State of California described in township 18 south and ranges 30 and 31 east, and also sections 31, 32, 33, and 34, in township 17 south and range 30 east, and by act of Congress approved October 1, 1890, the adjoining tract described as townships 15 and 16 south, ranges 29 and 30 east, and also township 17 south, range 30 east, except above mentioned sections 31, 32, 33, and 34, have been set apart for a public park, and the same shall be known as the "SEQUOIA NATIONAL PARK."

2. The park by said act is placed under the exclusive control of the Secretary of the Interior, and these rules and regulations are made and published in pursuance of the duty imposed on him in regard thereto.

3. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the government lands within the park.

4. It is forbidden to cut or injure any timber growing on the park lands. Camping parties will be allowed to use dead or fallen timber for fuel.

5. Fires shall be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

6. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

7. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent of the park in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

8. No person will be permitted to reside permanently or to engage in any business on the government lands in the park without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion, and no pack trains shall be allowed in the park unless in charge of a duly registered guide.

9. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; such lands, however, shall have the metes and bounds thereof so marked and defined as that they may be readily distinguished from the park lands. Stock may be taken over the park lands to patented lands with the written permission and under the supervision of the superintendent.

10. The herding or grazing of loose stock or cattle of any kind on the government lands in the park, as well as the driving of such stock or cattle over the same, is strictly forbidden, except in such cases where authority therefor is granted by the superintendent.

11. The sale or use of intoxicating liquors on the government lands in the park is strictly forbidden.

12. Private notices or advertisements shall not be posted or displayed on the government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

13. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, may be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

14. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the government lands in the park and enforce these rules and regulations and all the provisions of the act of Congress aforesaid.

REGULATIONS OF MARCH 30, 1907, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed on the government lands in the Sequoia National Park without authority from the superintendent of the park will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notices of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within thirty days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after ten days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof shall be carefully retained by the superintendent in a separate fund for the period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership; and if not so claimed within six months from the date of sale such proceeds shall be turned into the Sequoia National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

GENERAL GRANT NATIONAL PARK.

1. By act of Congress approved October 1, 1890, the tract of land in the State of California described as sections 5 and 6, in township 14 south, range 28 east of Mount Diablo meridian, and also sections 31 and 32 of township 13 south, range 28 east of the same meridian, have been set apart for a public park, and the same shall be known as the "GENERAL GRANT NATIONAL PARK," "General Grant" being the name by which the Great Tree therein is so widely known.

All other provisions of the General Grant Park regulations are the same as those for Sequoia National Park.

DEPARTMENT OF THE INTERIOR
ADMINISTRATIVE MAP OF
SEQUOIA AND GENERAL GRANT NATIONAL PARKS, CALIFORNIA

R 27 E · R 28 E · R 29 E · R 30 E · R 31 E · R 32 E

T 13 S · T 14 S · T 15 S · T 16 S

SEQUOIA NATIONAL PARK
GENERAL GRANT NATIONAL PARK
SEQUOIA NATIONAL FOREST
SEQUOIA NATIONAL FOREST BOUNDARY LINE
KINGS RIVER CANYON
KINGS RIVER
FRESNO CO
TULARE CO
Converse Mt
Converse Basin
Indian Basin
Long Meadow
Huckleberry Valley
Bearskin Meadow
Tornado Meadows
Horseshoe Bend
South Fork
Windy Gulch
Windy Cliffs
Kennedy Meadow
Burton Meadow
Burton Pass
Lost Meadow
Horse Corral Meadow
Deer Cove
Stag Dome
Summit Meadow
Lookout Pk.
Sentinel Ridge
Mt Hutchings
North Mt
North Dome
Buck Pk
Cedar Grove
Hotel
Grand Sentinel
Palmer Mt
Sentinel Dome
Avalanche Pk
Sugarloaf
Valley
Gardner Creek
Mist Falls
Glacier Monument
Bubbs Creek
The Sphinx
Cross Mt
Morraine Meadow
Bog Meadow
Scaffold Meadow
Ellis Meadow
Mt Morraine
Copper Creek
Happy Gap
Quail Flat
Buenavista Pk
Woodcock Meadow
Rabbit Meadow
Weston Meadow
Log Corral Meadow
Bacon Meadow
Grouse Meadow
Fox Meadow
Weaver Lake
Poison Meadow
Shell Mt
Big Baldy
Bearcrap Meadow
Stony Creek Meadow
Redwood Canyon
Redwood Mountain
Big Baldy Ridge
Pierce Valley
Eshom Pr
Burnt Pr
Liveoak Pass
Shadequarter Mtn
Pattee Rocks
Sheep Ridge
Cabin Meadow
Colony Meadow
Little Baldy
Halstead Meadow
Cahoon Meadow
Low Meadow
Long Meadow
Cactus Mt
Colony Pk
Round Meadow
Crescent Meadow
Moro Rock
Castle Rocks
Panther Pk
Merten Meadow
Alta Pk
Thraps Rock
Alta Meadow
Circle Meadow
Log Meadow
Deep Canyon
Park Road
Sevenmile Hill
Mitchell Pk.
Sugarloaf
Marvin Pass
Mt Maddox
Sunset Meadow
Williams Meadow
Sugarloaf Meadow
Rowell Meadow
Pond Meadow
Profile View
Ball Dome
Kettle Pk.
J.Q. Pass
Table Meadows
Long Meadow
Elizabeth Pass
Lion Rock
Lonepine Meadow
Bearpaw Meadow
Sugarbow Meadow
Redwood Meadow
Lippincott Mt
Triple Divide Peak
Whitebark Ridge
Glacier Ridge
Tableland
Moraine Ridge
Great Western Divide
Kaweah Peaks
Big Arroyo
Deadman Canyon
Copper Creek
Table Mountain
Timber Gap
Mineral King
Silliman Crest
Mt Silliman
Timpahute Lake
Twin Lakes
Chagoopa Plateau
Big Meadow
Hockett Meadows
Hockett Trail
Hockett Lake
Farewell Gap
Milk Ranch
Old Sawmill
Abbott Mill
Tanner Sawmill
Mineral King Rd
Generals Highway
Big Trees
Mineral King
Silver City
Monarch Lakes
Crystal Lake
Lake Kaweah
Kaweah River
Marble Fork
Middle Fork
South Fork
Wet Meadows Lake
Elizabeth Lake
Lion Lake
Lone Pine Lake
Triple Divide Lake
Table Lake
Hamilton Lake
Timpahute Lake
Twin Lakes
Crystal Lake
Monarch Lakes
Lake Kaweah
Chagoopa Plateau
Big Meadow
Hockett Meadows
Hockett Trail
Hockett Lake
Farewell Gap
Milk Ranch
Old Sawmill
Abbott Mill
Tanner Sawmill
Mineral King Rd
Generals Highway
Big Trees
Mineral King
Silver City

LEGEND

Park Limits

RELIEF
printed in brown

Figures
showing heights above mean sea level determined

Contours
showing height above sea horizontal form an steepness of slope of the surface

DRAINAGE
(printed in blue)

Springs

Canals and ditches

Intermittent streams

CULTURE
(printed in black)

SEQUATCHIE

VALLEY

PARK

BLUE RIDGE

GREAT

EASTERN

DIVIDE

Lumber Gap

Sawteeth Peak

Needhair Mt

Vahdevol Mt

Case Mt

Gap

Gap

Publishers

Churches and school houses

Post office and secondary roads

Roads

Railroads

Bridges

U.S. township and section lines

Section corners located

County lines

Reservation lines

Triangulation stations

Bench marks

REPORT OF THE ACTING SUPERINTENDENT OF THE MOUNT RAINIER NATIONAL PARK.

REPORT OF THE ACTING SUPERINTENDENT OF THE MOUNT RAINIER NATIONAL PARK.

ORTING, WASH., *September 28, 1909.*

SIR: I have the honor to submit the following report of the condition of affairs in the Mount Rainier National Park for the season of 1909:

By the act of Congress approved March 2, 1899 (30 Stat., 993), certain tracts of land therein described, lying in the State of Washington, were set aside for the benefit and enjoyment of the people of the United States, to be known as the "Mount Rainier National Park." This park is 18 miles square, with an area of 207,360 acres, and lies wholly within the Rainier National Forest. The summit of Mount Rainier is about 1½ miles southwest of the center of the park, but the reservation includes substantially the whole mass of the mountain proper, with its wonderful glaciers.

The park by said act is placed under the exclusive control of the Secretary of the Interior, who, among other things, is authorized to establish rules and regulations and cause adequate measures to be taken for the preservation of the natural curiosities, timber, mineral deposits, game, etc., and the removal of unlawful occupants or trespassers.

TOPOGRAPHY.

Mount Rainier is situated apart from and to the west of the main range of the Cascades. The ridges which radiate from it are high and broken. The entire area of 324 square miles included within the boundary of the park is very rough and mountainous. The summit of Mount Rainier is 14,526 feet in altitude. The lower valleys of the Carbon and Nisqually rivers are not more than 2,000 feet above sea level, but the general elevation of the park exceeds 4,000 feet. Although there is little rain or snow from the 1st of July to the middle of September, the precipitation during the remainder of the year is very great. The season of tourist travel is confined to July, August, and early September. From November until June the park, except in a few places along the boundary, is impassable.

The summit of Mount Rainier is accessible from Camp of Clouds, in Paradise Valley, and from St. Elmo Pass, between the White and Emmons glaciers. The difficulty of the ascent depends largely upon the condition of the snow fields, which vary from year to year. It is ordinarily somewhat dangerous unless the party is accompanied by a guide or by some other person who has already been over the route. On August 14, 1909, two men who started to make the ascent from Paradise Valley perished in a storm.

Between and below the glaciers are numerous open slopes and valleys, which are covered with a luxuriant growth of grasses, sedge, and flowering plants. These parks are diversified by growths of alpine fir and hemlock and by many small lakes and running streams. They present a pleasing contrast to the snow fields and rugged peaks by which they are surrounded, and are greatly admired by visitors. The most frequented of the parks is known as Paradise Valley. It is easily accessible from the government road. Near Paradise Valley and at the headwaters of Tacoma Fork is Indian Henry's Hunting Ground, so named from the circumstance that it was formerly the favorite resort of a small band of Klickitat Indians. Grand Park, between the main and west forks of White River, is one of the largest and most beautiful of these open tracts. At the altitude of 6,000 feet it is an almost level grassy plateau, the greater part of which is entirely without timber. Moraine Park, between the Sluiskin Range and the Carbon Glacier, is a small and very attractive mountain valley.

FOREST CONDITIONS.

The forest in the lower valley is of the type characteristic of western Washington and Oregon. The undergrowth is dense and the forest floor is covered with moss and with a litter of fallen branches and decayed wood. The predominant trees are the Douglas fir, hemlock, white fir, and cedar. At 3,000 feet these species occur together with the lovely and noble fir. From 4,000 feet to snow line the forest is distinctly alpine and consists of mountain hemlock, alpine fir, and Alaska cedar. On the high ridges are numerous and extensive tracts of timber killed by fire before the creation of the park. These areas are reforesting very slowly. The high winds, scanty soil, short summers, and extremely cold winters are conditions unfavorable to tree growth. There have been no recent burns.

Along the Carbon and Nisqually rivers there is a considerable amount of dead cedar. The removal of this material, if conducted in a proper manner, will be a decided advantage to the park. It will to some extent reduce the fire danger. The greatest difficulty in extinguishing small fires arises from the presence of dead standing timber. The fire burns to the top of the dead trees and the sparks are blown to a great distance. The stumps should be cut very low, so that they will be concealed by the growth of vegetation. The débris should be carefully cleaned up. The removal of these unsightly snags should add to the attractiveness of the park, and the clearing up of the fallen timber and building of the wood roads will make many pleasant camping grounds along the bank of the river. The work should be constantly supervised by one of the park officers, in order to prevent damage to undergrowth and standing timber.

The dead cedar on a designated area along the Nisqually River was advertised and sold to the highest bidder at $1.30 per cord. The bolts are hauled to the river and floated to a mill near Ashford. Cutting commenced August 3. On August 28 the purchaser had cut 470 cords of bolts. This material was taken from an area of 30 acres. The park officers report that the cutting has been carried on in a proper manner. No estimate has been made of the dead cedar on the Carbon River. Except for the small amount of fuel required by the hotels, dead timber other than cedar has no value.

ROADS AND TRAILS.

The Nisqually Valley and the south slope of Mount Rainier are easily reached by the government road, built by the Engineer Corps, United States Army. This has been constructed from the western boundary of the Mount Rainier National Forest, where it connects with the county road. On account of the increasing travel to Mount Rainier the latter roads have been greatly improved and in part relocated by the county authorities. Ashford, at the terminus of the Tacoma Eastern Railroad, is 5 miles from the western boundary of the park. During the summer a daily stage is maintained between Ashford and Longmire Springs. The government road in the Nisqually Valley was on July 1, 1909, completed for a distance of 18 miles, nearly completed and open to travel for 2 miles, and partially completed a distance of 2 miles farther. It has been carefully located so as to secure the best possible grade and to afford a desirable outlook upon points of interest. From Longmire Springs it ascends the south slope of the mountain and crosses the Nisqually at the foot of the glacier. After leaving the glacier the road turns to the south, avoiding the high ridge between the Nisqually River and Paradise Creek. After passing this obstacle the general course of the road is northeasterly, following the valley of Paradise Creek. The scenery along the road is much admired, and the gradual change in the landscape from forests along the Nisqually to the open alpine parks above Narada Falls is particularly interesting.

It is to be regretted that no means have been found to dispose of the brush and refuse which resulted from clearing the roadbed. From the park boundary to Longmire Springs, rotten wood, logs, brush, and stumps are piled on either side. Apart from the unsightly appearance presented, this litter is a great source of fire danger. The latter part of August is dry, and if the débris were kindled by a match thrown aside by a careless smoker, there would very likely be a serious fire. On account of the great amount of this material and the manner in which it has been piled, it could hardly be cleared for less than $300 per mile. This sum, however, would be well expended.

The northern and northwestern parts of the park are usually reached by way of Fairfax, on the Northern Pacific Railroad. From this place trails lead to the Carbon River, Spray Park, and the Mowich River. A trail should be made from the Carbon River easterly and southerly around the base of Mount Rainier to the Cowlitz watershed. The best route at the lowest practicable altitude should be chosen. Since the first object should be to facilitate patrol, the trail should be so located as to be open late in the season. The sum of $300 was expended in the summer of 1908 in preliminary work from a point on the Carbon River about 1 mile below the glacier to the west branch of White River. Little grading was done, but the route was cleared and made barely passable for horses. An expenditure of $1,200 was authorized for the completion of this trail and work was commenced in the summer of 1909. The high price of labor and the cost of bringing in supplies on pack animals renders trail construction in this region expensive, and the work can be carried on only during the summer months. To complete the trail from the West Fork up to Grand Park will require an additional

expenditure of $300. From Grand Fork to the Inter Glacier at the head of White River the country is open and can be traveled by horses with no great difficulty. From White River to the Cowlitz the country is little known. A careful examination will be necessary before the location and cost of the trail can be determined. While the trail system from the Carbon around Mount Rainier should be gradually extended, there is no immediate or urgent necessity of construction beyond the head of White River.

For better fire protection, and for the convenience of the public, several short trails are required. The proposed Cataract trail is intended to connect Spray Park and the headwaters of the Mowich with the main Carbon River trail. At present horse travel between the Carbon and Mowich watersheds is possible only by a detour of many miles, which takes the rangers outside of the park and involves a two days' journey. From careful estimates made by the ranger in the Carbon district, it appears that a trail 3½ miles long with a maximum grade of 25 per cent would connect these valleys and could be built for about $1,000. It would be a great convenience, not only for the rangers, but to the general public.

Moraine Park is one of the most attractive alpine valleys in the Cascades. By far the most direct route by which it can be reached is over the Carbon Glacier. The trail over the ice is temporary and can be kept up only by repairing it each spring. No feasible route over the ridges on either side of the glacier has been found.

The Carbon River trail should be extended 1 mile to the foot of the glacier, the estimated cost being $75.

In the Nisqually district the Cowlitz Fork and Tacoma Fork trails should be repaired. The cost of clearing out both of these trails will be about $300.

RANGER CABINS.

Three ranger cabins have been built in the park. The gate keeper's cabin on the government road is a small story-and-a-half building. Since the lower part is used for an office and the upper for a sleeping room, a small kitchen should be built on one side. The cabin at Longmire Springs and the cabin on the Carbon River have neither been properly finished. The work to be done consists of completing the interior, and could be finished by the ranger. A suitable kitchen at the boundary will cost $60. Each cabin should be furnished with chairs, bedstead, and table. A stable is needed at the Carbon River station. Under existing conditions the three cabins already built will, when properly finished, be sufficient for the use of the rangers. At the head of the Mowich, at Crater Lake, and in the lower part of Moraine Park, there are cabins which have been abandoned by prospectors. They afford sufficient shelter for the use of the rangers who are on duty in these regions during the summer.

Four sheds should be built for storing tools to be used in fighting fire. One should be built in Paradise Valley, one in Indian Henry's Hunting Ground, one on the West Fork of White River, and one on the government road between the boundary and Longmire Springs.

It has been suggested by several persons interested in mountain climbing that a shelter be built at Gibraltar Rock, on the south side of Mount Rainier, and at Camp Curtis, near the Emmons Glacier. The proposed sites are difficult of access and a long distance above

timber line. No one seems to have a very definite plan for the construction of shelter. Stone walls or monuments built 4 or 5 feet high and over which canvas could be stretched would serve as windbreaks and might be sufficient protection for people hardy enough to derive pleasure from climbing the mountain. A structure made of stone and cement would be preferable. A small stone hut of this material could be put up at Gibraltar Rock for about $600.

PROSPECTING.

There are in the park no mines from which the owners derive any revenue from the sale of ore. During the past season there has been comparatively little prospecting. In the Carbon River and White River districts and about Glacier Basin there are about 90 prospects to which an active claim is asserted. The Washington Mining and Milling Company holds 30 claims situated on the south side of Carbon River in the northwestern part of the park. Considerable development work has been done on some of the claims. Several buildings have been put up and tunnels made in the side of the mountain. The company contemplates building a road from these claims to the logging railroad constructed in the winter of 1908–9 from Fairfax to section 6, township 17 north, range 7 east, in the Mount Rainier National Forest. In the same part of the park six claims are held by J. I. Sexton, of Tacoma, and his associates, under the name of Hepzibah Mining Company, and two claims are held by Mr. Fritz Hoose, of Fairfax. The fir and cedar timber on and in the vicinity of the claims held by the Washington Mining and Milling Company and the Hepzibah Mining Company is very heavy. Some of the trees are from 10 to 12 feet in diameter. The undergrowth is dense and there is special need of fire protection.

Eight claims are held by the Washington Mining and Milling Company in the Cataract Creek Basin. The assessment work done on this group has been nominal only.

Forty claims are held in Glacier Basin by the Mount Rainier Mining Company under the management of Mr. Peter Starbo, of Enumclaw. This basin is situated at an altitude of 9,000 feet, between the White and Emmons glaciers. Owing to the profuse growth of mountain grasses and flowering plants and the fine groves of alpine timber, it is one of the most pleasing of the smaller parks. Mountain goat were formerly common in the vicinity. The mining claims are all contiguous and are located in the basin and on the ridges that surround it. The mining is done on the claims in the upper end of the basin and the tunnels run in the direction opposite to that by which the other claims would be reached. The lower claims in the group are in the timber. A sawmill with an estimated daily capacity of 10,000 board feet is operated by water power to produce timbers and lumber for the mine. The development work includes one tunnel 700 feet long, one tunnel 73 feet long, and a prospect hole 13 feet deep. Two cabins, 14 by 22 feet and 15 by 30 feet, a barn, 18 by 25 feet, and a blacksmith shop, 16 by 18 feet, have been built. Rifles have been repeatedly taken from the cabins occupied by the miners. The owners of these weapons stated that they were aware that firearms were not allowed in the reservation without permits, but that they only took the guns for use outside of the park while on their way to and from the settlements.

There has been little prospecting in the Nisqually district. Several claims are held in the vicinity of Longmire Springs. During the last fiscal year three prospectors have visited their holdings and have done some assessment work.

Notwithstanding the act of May 27, 1908, which prohibited the location of mining claims in the Mount Rainier National Park, several claims have been located and recorded in the office of the auditor of Pierce County during the past fiscal year. The circumstance that the location was recorded presumably led the claimants into the belief that they could hold the claims. It does not appear that they have any serious intentions to develop the proposed prospects or in any way to assert a claim further than to file notice of a location which was in itself invalid. Owing to the nature of the descriptions given in the record, it was impracticable to determine exactly how many of the claims were taken within the limits of the park. The location was often identified by the landmarks not generally known, and there was a general indefiniteness in the descriptions.

TRAVEL.

The record kept at the entrance to the park shows that from July 1, 1908, to June 30, 1909, 3,670 visitors entered by way of the government road. Of this number 3,342 were transient visitors and 328 remained three or more days. One hundred and twelve visitors entered the park by way of Fairfax, 100 being campers who remained three or more days. The total number of visitors known to enter the park was 3,782. No doubt the actual number was somewhat greater, since there were a few visitors late in the season when no ranger was stationed at the entrance.

The greater proportion are transient visitors who come by stage. Travel has increased during the past summer. In July, 1909, the number entering by the government road was 1,905, most of them traveling by stage. Four hundred and sixty-seven came in automobiles, and 86 were campers with wagons, or on foot.

FIRES.

In the summer of 1908 a forest fire was started near the west branch of White River by lightning, which struck a dead hemlock. The fire was extinguished with great difficulty owing to the remoteness of the place and the distance from tools and provisions.

While the fire danger is always present in the latter part of the season, it has appreciably diminished during the past two years. There have been fewer camping parties, and the public have generally been more careful in regard to fires.

PATROL.

During the fiscal year of 1909 the ranger force consisted of four men. Two rangers were on duty throughout the year. One was stationed in the Nisqually Valley; the other had charge of the northern part of the reservation, and maintained a patrol from the White River to the Puyallup. During the summer months a temporary ranger was detailed as gate keeper at the entrance of the park. It was his duty to regulate the automobile travel and to keep a record

of the tourists. The removal of the dead timber was placed in charge of an additional ranger. On account of the increase of travel this force will be insufficient for the summer of 1910. The Nisqually district requires three men. One is necessary as gate keeper, and two more are required to patrol the government road in the vicinity of Paradise Valley. In the northern part of the reservation one man should be stationed at Grand Park, one in the Carbon Valley, and one on the Mowich and Puyallup.

There have been numerous applications for positions as park ranger, either permanent or temporary; but it has been difficult to find men really qualified for the position who care to accept a temporary appointment for the summer season.

GAME.

Deer are fairly numerous in the park. They are particularly abundant in the watersheds of the Puyallup, Mowich, and Carbon rivers. It is to be presumed that notwithstanding the efforts of the rangers they are occasionally shot in the Puyallup district within the limits of the park. In the Nisqually district a man was arrested by the ranger for killing deer. He was convicted and fined $100. There are several bands of mountain goat in the park, but since the construction of the government road they have been seldom seen about Paradise Valley. A large number have been seen near the Cowlitz and Puyallup glaciers, at the head of Rainier Fork, and about the Sluiskin Range.

Bear and wild cats are common and cougars are occasionally seen. Four cougars were killed in the immediate vicinity of the park during the winter of 1908–9. No doubt many young deer are killed by cougars and wild cats. It might be well for the park rangers to secure the assistance of a trained hunter with dogs in order to reduce the number of these animals.

BOUNDARIES.

The boundary line of the park was definitely established by a survey completed in the fall of 1908, by W. H. Thorn. Prior to this survey the location of the eastern boundary was unknown. The existing maps should be corrected and the true location of White River and of the summit of the Cascades with reference to the eastern boundary shown. It is very desirable that a topographic survey of the park be made by the United States Geological Survey. An accurate contour map showing in detail the amount and character of the timber and the area of the fields, open parks, and burns would be very interesting to the public and of great value to the administration of the park.

MINERAL SPRINGS.

The Longmire mineral springs near the Nisqually River are well known and have been frequented by tourists for many years. A mineral spring has recently been found in Moraine Park. The water is described by the rangers as flowing freely and having a temperature of about 75°. The ground about the spring showed the tracks of numerous mountain goat which frequent the place on account of the saline properties of the water.

AUTOMOBILES.

There were 346 automobile permits issued during the season of 1909. The speed at which machines may be driven is limited to 15 miles per hour, and this rate is further reduced at all abrupt curves. Signs indicating the exact rate of speed allowed on each part of the road are posted at proper intervals. There should be no particular danger in the use of automobiles in the park if the hours and speed limits are observed. The automobile regulations of March 12, 1909, provide certain hours for the use of automobiles, and in effect declare certain portions of the road clear of machines at other times. Since this assurance has been given the public, it is evident that no exceptions should be made except in case of extreme urgency. The danger in exceeding the speed limit is obvious. There has been a general disposition to comply with the regulations and there have been no very serious accidents. In one instance a machine was run off the bank by an incompetent driver and the owner's arm was broken. Three other accidents were reported, none of which had any serious results.

The road is open to automobiles as far as the Nisqually Glacier, and it is expected that in another season it will be safe for machines to go to Narada Falls. Permits should be issued at the entrance to the park. An annual charge of $25 is recommended for each machine engaged in the business of transporting passengers. No other change is recommended in the regulations regarding automobiles.

HOTELS AND CAMPS.

The National Park Inn, at Longmire Springs, is operated by the Tacoma Eastern Railroad Company. The main building is well designed and attractive, but some improvement could be made in the surroundings and outbuildings. The management, which in 1908 was poor, has been much improved during the past summer. In addition to the sleeping rooms in the hotel, seventy tents were put up on the grounds adjoining. The refuse from the hotel kitchen is deposited in the Nisqually River. This is the cheapest way, and the waters of the Nisqually, which is a glacial stream and turbid in summer, are not often used for drinking purposes. However, the dumping of garbage into running streams is in itself objectionable and the management should be required to find some other way to dispose of the refuse.

The Longmire Springs Hotel is maintained on patented land. The rates are somewhat lower than those at the National Park Inn. In this respect the Longmire Hotel is an advantage to the public. However, the place is conducted with an entire disregard for appearances. It has been inclosed by a wire fence, and one or two of the most dilapidated buildings have been taken down. In other respects no material change has been made in the place. The buildings are very rough, and the fence is hung with signs and advertisements. One of the most objectionable features is a board shanty used for a pool room, which was put up in a conspicuous place close to the road. The hotel has, however, been conducted in a proper and orderly manner and it is to be trusted that new buildings will be erected, and the grounds hereafter kept in a manner suitable to the location.

In Paradise Valley a tent hotel is maintained by John L. Reese, who holds a permit for forty tents. The place is popular and well managed. A similar enterprise is conducted at Indian Henry's Hunting Ground by Mr. George B. Hall.

SPECIAL PERMITS.

The stage line from Ashford to Longmire Springs is operated by the Tacoma Carriage and Baggage Transfer Company. On August 20, 1909, the company used 2 five-seated tallyho wagons, 4 three-seated stages, and 2 baggage wagons. Thirty head of horses were used. In addition to the regular trip from Ashford to the springs the company sells tickets and furnishes transportation to the glacier and to Narada Falls.

A livery business is maintained by Mr. George B. Hall at Longmire Springs. Mr. Hall has a barn, 80 by 52 feet; a shed, 24 by 100 feet; and two smaller buildings used for residence and storage. These buildings are well constructed and the premises kept in good condition. The equipment includes 60 head of saddle horses, 7 pack animals, 13 driving horses, 3 buggies, a stage, and 2 freight wagons.

A general photographic business is conducted by Mr. L. G. Linkletter at Longmire Springs during the summer months.

On April 26, 1909, an agreement for the construction and maintenance of a telegraph and telephone line in the park was entered into by Mr. John M. Bell and others, of Tacoma. Construction was to be completed within three months, but it seems to have been postponed for an indefinite period.

ESTIMATES AND RECOMMENDATIONS.

Estimates for the ensuing fiscal year are as follows: Salaries of 2 regular and 4 temporary park rangers, $3,500; trails, protection from forest fires, etc., $2,150; shelter at Gibraltar Rock, $600; total, $6,250.

Particular attention should be given to fire protection. The refuse along the park road should be cleaned up and stations equipped with tools established at the proper places. Persons holding mining claims within the park should be required to pile all the brush resulting from their operations and to burn it during the winter months. I have further to recommend the survey and mapping of the park by the United States Geological Survey, and the appropriation of a sufficient sum by Congress to purchase the 18.2 acres of patented land known as the "Longmire tract."

Very respectfully,

G. F. Allen,
Acting Superintendent.

The Secretary of the Interior.

RULES AND REGULATIONS.

GENERAL REGULATIONS OF JUNE 10, 1908.

Pursuant to the authority conferred by the acts of Congress approved March 2, 1899, and May 27, 1908, the following rules and regulations for the government of the Mount Rainier National Park, in the State of Washington, are hereby established and made public:

1. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the government lands within the park.

2. It is forbidden to cut or injure any timber growing on the park lands, or to deface or injure any government property. Camping parties will be allowed to use dead or fallen timber for fuel.

3. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

5. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook or line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

6. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the government lands in the park, without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

7. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; such lands, however, shall have the metes and bounds thereof so marked and defined that they may be readily distinguished from the park lands. Stock may be taken

over the park lands to patented lands with the written permission and under the supervision of the superintendent.

8. Hereafter the location of mining claims under the mineral-land laws of the United States is prohibited within the park. Persons who have heretofore acquired in good faith rights to any mining location or locations shall not be permitted to injure, destroy, or interfere with the retention in their natural condition of any timber, mineral deposits, natural curiosities, or wonders within said park outside the boundaries of their respective mining claims duly located and held under the mineral-land laws.

9. The herding or grazing of loose stock or cattle of any kind on the government lands in the park, as well as the driving of such stock or cattle over the same, is strictly forbidden, except in such cases where authority therefor is granted by the superintendent.

10. No drinking saloon or barroom will be permitted upon government lands in the park.

11. Private notices or advertisements shall not be posted or displayed on the government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the government lands in the park and enforce these rules and regulations and all the provisions of the acts of Congress aforesaid.

REGULATIONS OF JUNE 10, 1908, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed in the Mount Rainier National Park without authority from the Secretary of the Interior will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notice of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within thirty days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after ten days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale, such proceeds shall be turned into the Mount Rainier National Park fund.

The superintendent shall keep a record, in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

REGULATIONS OF MARCH 12, 1909, GOVERNING THE ADMISSION OF AUTOMOBILES DURING THE SEASON OF 1909.

Pursuant to authority conferred by the act of March 2, 1899 (30 Stat., 993), setting aside certain lands in the State of Washington as a public park, the following regulations governing the admission of automobiles into the Mount Rainier National Park during the season of 1909 are hereby established and made public:

1. No automobiles will be permitted within the metes and bounds of Mount Rainier National Park unless the owner thereof secures a written permit from the acting superintendent, G. F. Allen, Orting, Wash., or his representative.

2. Applications for permits must show: (*a*) Name of owner, (*b*) number of machine, (*c*) name of driver, and (*d*) inclusive dates for which permit is desired, not exceeding one year, and be accompanied by a fee of $5 for each machine.

Permits must be presented to the superintendent or his authorized representatives at the park entrance on the government road. The permittee will not be allowed to do a transportation business in the park without a special license therefor from the Secretary of the Interior.

3. The use of automobiles will be permitted on the government road from the western boundary of Mount Rainier National Park to Longmire Springs between the hours of 8 a. m. and 6.30 p. m., but no automobile shall enter the park or leave Longmire Springs in the direction of the western boundary later than 6 p. m.; the use of automobiles to be permitted on the government road between Longmire Springs and the glacier from 9 a. m. to 11 a. m. and between the hours of 3.30 p. m. and 5.30 p. m.: *Provided, however,* That the superintendent may, in his discretion, make rules for the regulation of automobiles on that portion of the government road beyond Nisqually Glacier when it is safe to permit automobiles thereon. Until the making of such rules no automobile shall be permitted to go beyond Nisqually Glacier.

4. When teams approach, automobiles will take position on the outer edge of roadway, regardless of the direction in which they are going, taking care that sufficient room is left on the inside for the passage of teams.

5. Automobiles will stop when teams approach, and remain at rest until teams have passed or until teamsters are satisfied regarding the safety of their teams.

6. Speed will be limited to 6 miles per hour, except on straight stretches where approaching teams will be visible, when, if no teams are in sight, this speed may be increased to the rate indicated on signboards along the road; in no event, however, shall it exceed 15 miles per hour.

7. Signal with horn will be given at or near every bend to announce to approaching teams the proximity of an automobile.

8. Teams have the right of way, and automobiles will be backed or otherwise handled, as necessary, so as to enable teams to pass with safety.

9. Permits issued under the regulations of June 10, 1908, which extend over a part of the season of 1909, will be subject to these regulations. All automobile regulations heretofore issued are canceled and revoked.

10. Violation of any of the foregoing rules or the general regulations for the government of the park will cause the revocation of permit; will subject the owner of the automobile to any damages occasioned thereby and to ejectment from the reservation; and be cause for refusal to issue a new permit to the owner without prior sanction in writing from the Secretary of the Interior.

MOUNT RAINIER NATIONAL PARK

Compiled from various sources
Under direction of Maj. H.M. Chittenden, Corps of Engineers, U.S.A.
By Eugene Ricksecker, Asst. Engr
November 1906
Scale 2 miles to 1 inch
Revised to October 1908

Roads open to travel at end of the season
Roads that are projected but not yet open to travel
Trails.

REPORTS OF THE SUPERINTENDENT OF MESA VERDE NATIONAL PARK AND J. WALTER FEWKES, IN CHARGE OF EXCAVATION AND REPAIR OF RUINS.

REPORT OF THE SUPERINTENDENT OF MESA VERDE NATIONAL PARK.

OFFICE OF THE SUPERINTENDENT,
Mancos, Colo., October 9, 1909.

SIR: I have the honor to submit the following report on the management of the Mesa Verde National Park for the season of 1909.

By act of Congress approved June 29, 1906 (34 Stat., 616), certain tracts of land in Montezuma County, Colo., adjacent to the Southern Ute Indian Reservation, were reserved and withdrawn from settlement, entry, sale, or other disposal, and set apart as a public reservation to be known as the "Mesa Verde National Park." The area of this tract is 66.2 square miles, or 42,376 acres, and the altitude of the highest point, Point Lookout, is 8,700 feet above sea level and 2,000 feet above the Montezuma Valley, the southern rim of which follows the park boundary line on the north for miles.

The park is placed under the exclusive control of the Secretary of the Interior, who is authorized to prescribe such rules and regulations and establish such service as he may deem necessary for the care and management of the park, and for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man within the limits of the reservation, and to grant permits for the examination, excavation, and other gathering of objects of antiquity by any person or persons deemed properly qualified to conduct the same, provided they are undertaken only for the benefit of some reputable museum, university, college, or other recognized scientific or educational institution, with a view to increasing the knowledge of such objects and aiding the general advancement of archæological science.

The act also provides that all prehistoric ruins situated within 5 miles of the boundaries of the park, on Indian and public lands not alienated by patent from the ownership of the United States, shall be under the custodianship of the Secretary of the Interior, to be administered by the same service established for the custodianship of the park. The area of this 5-mile strip is about 274 square miles, or 175,360 acres.

LOCATION AND CHARACTER OF RUINS.

The Rio Mancos cuts through the park and abutting 5-mile strip from northeast to southwest, forming a canyon 1,000 to 2,000 feet deep. On both sides of this gorge, more especially to the west, narrow lateral canyons of like depth and even more picturesque beauty cut the mesa into shreds, producing successions of huge promontories, sculptured ledges, and bold, jagged cliffs. The Navaho, Cliff, Moccasin, and Ute are the principal canyons which enter the Mancos

from the north. These, with their numerous branches, furnish the labyrinth of cliffs in the high and almost inaccessible recesses of which we find the abandoned homes of the ancient inhabitants. The Fort Lewis, Grass, and Webber canyons, running into Mancos Canyon from the east, contain many ancient ruins, but are rather less picturesque than those on the west.

Within the park jurisdiction are many notable prehistoric ruins, the cliff dwellings comprising a group of great importance to the study of American archæology.

The principal and most accessible ruins are the Spruce Tree House,[a] located near the head of a draw of Navaho Canyon, originally containing about 130 rooms, but now reduced to 114 rooms and 8 kivas, or ceremonial rooms; the Cliff Palace,[b] located about 2 miles east of the Spruce Tree House, in a left branch of the Cliff Canyon, consisting of a group of houses with ruins of about 200 rooms, including 23 kivas of various shapes, and a tapering loopholed tower, forming a crescent of about 100 yards from horn to horn, which is reputed to be one of the most famous works of prehistoric man in existence; the Balcony House, a mile east of the Cliff House, in Cliff Canyon, containing about 25 rooms, some of which are in almost perfect condition. In each of these villages is an elaborate system of fortifications, in some cases walls 2 feet 3 inches thick and 20 feet high, watchtowers 30 feet high, and blockhouses pierced with small loopholes for arrows.

These villages and other important ruins, particularly the Spring House, Long House, and Mug House, are located on the Southern Ute Indian Reservation, within the 5-mile strip surrounding the park, where the park jurisdiction is not exclusive, and when tourist travel increases the preservation and protection of such objects of antiquity will no doubt be more difficult than for the ruins on park lands.

GENERAL STATEMENT.

The headquarters of the superintendent were maintained in the Bauer Block, Mancos, Colo., until May 1, 1909, at which time larger quarters were obtained in a building detached from the business houses. The work of the year has consisted in the protection of the ruins in the park from vandalism; the preservation of order, general oversight over tourists travel, the building of roads and improvement of trails and water supply, and cooperation in the work of excavation and repair of ruins. As yet no permanent buildings have been erected in the reservation.

ORDER IN THE PARK.

No vandalism has been committed on the ruins during the past season, or unlawful excavations attempted. No violations of the game laws have been detected, and it was not found necessary to remove any persons for disorderly conduct or violation of the park regulations.

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[a] A description of Spruce Tree House is given in the report of Dr. J. Walter Fewkes, Smithsonian Institution, accompanying the 1908 report of the superintendent of the Mesa Verde National Park. A more detailed account of the ruins and descriptions of the antiquities are given in Bulletin No. 41 of the Bureau of American Ethnology, published as House Document No. 1530, Sixtieth Congress, second session.

[b] The report of Dr. J. Walter Fewkes on excavation and repair of Cliff House during the summer of 1909 is hereto appended.

MOVEMENTS OF STOCK.

About 600 head of cattle were moved across the park in November, 1908, destined for the Southern Ute Indian Reservation, and the same number were drifted back north in the spring to the Montezuma Valley.

ROADS AND TRAILS.

Entrance to the park can still be effected only on horseback; the carriage road ends at the foot of the mesa, 15 miles from Mancos, the nearest railroad station, and from the foot of the mesa horses are taken for the remainder of the distance. The expense of conducting the excavations and improvements of every kind is very great because of this lack of a suitable highway. All supplies, tools, and material have to be transported by means of pack animals at present, and this expense could be materially lessened by a good road.

The Mills survey, made in the spring of 1908, provided for a wagon road from the northern boundary of the park to the Spruce Tree House on the south, estimated to cost about $15,000. The less expensive part of the work, extending from Spruce Tree House to station 663, on the line of survey, was performed last fall, as far as the funds would permit, at a total cost of $1,700. This lies entirely upon the top of the mesa. There was also constructed a trail system connecting Spruce Tree House, Cliff Palace, Peabody House, and Balcony House.

Nearly all of the $2,000 allotted for road construction from the appropriation for the current fiscal year has been expended this summer, and the road from station 0 to 17, which is a very difficult piece of construction, was completed, and from station 17 to 27 it is partially completed. From station 27 to 53, at the head of Morefield Canyon, the cost will be about $1,000, but from that point to station 663 it will probably not exceed six or seven hundred dollars per mile. The first mile of road now constructed at the northern boundary is of the greatest importance in getting to the top of the mesa, and next year the work should progress more rapidly. The wagon road from station 0 to 53 will be one of the finest scenic roads in the country, offering a view into Utah, New Mexico, and Arizona.

As the park was created for the purpose of making the ancient ruins therein accessible to the traveling public, there should be another carriage road constructed wholly upon the mesa, touching the points of greatest scenic and historic interest. The most favorable route would probably be from Spruce Tree House along the rim of Navaho Canyon, touching Alcove House, Navaho Point, the Swallows' Nest, Peabody House, and Casa Colorado; thence across the mesa to Cliff Canyon, at a point overlooking the ruins of Cliff Palace, Cedar House, and the Fewkes Canyon group; thence around to Cliff Palace and across to Balcony House on Ruin Canyon, from which point it should return in a direct line to Spruce Tree House. This road would be about 8 miles in length, and the cost of construction comparatively small.

Because of the great depth of the canyons, cutting the mesa from north to south, the expense of building a road to some of the most interesting ruins in the western part of the park is too great for it to be undertaken at present, although trails could be built for $500

from Spruce Tree House to the important ruins of Garfield Canyon and its tributaries and bring them within four hours' ride of the former ruin.

WATER SUPPLY.

The springs and cisterns in Spruce Tree House Canyon having proven adequate for the use of travelers and stock, no further expenditures were made on the water supply at the ruins. In order to provide water in the northern part of the park, near the road leading to the ruins, a well was sunk 30 feet at the head of Navaho Canyon, at a small cost, and a good supply of water obtained.

EXCAVATION AND REPAIR OF RUINS.

The sum of $2,000 was set aside for the purpose of excavating and repairing ruins during the past fiscal year, as well as a similar sum from the appropriation for the current fiscal year, practically all of which was expended between May 12 and August 31, 1909, under the direction of Dr. J. Walter Fewkes, of the Smithsonian Institution, on the Cliff Palace ruin. This ruin was completely cleared of all loose stones, dirt, and other débris. Walls that were found to be in a dangerous condition were properly repaired and strengthened and such restoration effected as seemed necessary for the preservation of the buildings. Such antiquities as were found were forwarded to the National Museum at Washington.

TRAVEL.

As predicted in last year's report, no marked increase of travel to the park occurred, because of the lack of a wagon road; until this obstacle is overcome only those capable of a rather trying horseback trip will visit the park. The number registered for the year was 165. These were mostly regular travelers and tourists, who stayed from one to three days.

PRIVILEGES.

I desire to repeat what was said in last year's report concerning privileges. The act setting aside the Masa Verde National Park is defective in that no provision was made for the granting of privileges or leasing of sites for the entertainment and accommodation of tourists.

House bill 19861 (60th Cong., 1st sess.), introduced by Hon. Warren A. Haggott, was designed to empower the Secretary of the Interior, upon terms and conditions to be fixed by him, to grant leases and permits for the use of the lands or development of the resources thereof, in the Mesa Verde National Park and 5-mile strip, and the use of the revenues derived therefrom in the administration of the reservation Mr. Guggenheim reintroduced a similar bill (S. 1751 61st Cong., 1st sess.), but it has not yet become a law. Such legislation would incidentally include the right to lease lands for coal mining and grazing, and should provide a good revenue to help maintain the reservation, especially as coal is known to underlie a large portion thereof, and there is a local demand for the opening of mines heretofore operated before the mining claims were invalidated by the reservation of the lands for park purposes.

LANDS.

At the time of the creation of this park there were 240 acres of patented lands, 800 acres in unperfected entries, and school sections 16 and 36, aggregating 2,080 acres, within the reservation. During the year unperfected homestead entry No. 2528, of William U. Michaels, covering 160 acres, was canceled for expiration of the statutory period in which to submit final proof. Under date of January 8, 1909, all of the school sections were eliminated by the certification to the State of Colorado of certain lieu selections contained in Denver lists Nos. 405, 407, 408, and 409, and these tracts are now available for general park purposes.

The patented holdings in the park are now as follows:

Final homestead entry 915, Albert Prater, for SE. ¼, SE. ¼, sec. 18, E. ½, NE. ¼ and NE. ¼, SE. ¼, sec. 19, T. 35 N., R. 14 W., New Mexico meridian, 160 acres, patented November 14, 1905.

Final homestead entry 1021, William F. Prater, for SE. ¼, SE. ¼, sec. 19, E. ½, NE. ¼ and NE. ¼, SE. ¼, sec. 30, same township, 160 acres, patented August 10, 1906.

Preemption cash entry 395, George Comfort, for NE. ¼, NW. ¼, sec. 26, same township, 40 acres, patented July 14, 1891.

Preemption cash entry 339, Frederick Richards, for NE. ¼, SW. ¼, sec. 26, same township, 40 acres, patented July 14, 1891.

This gives a total of 400 acres in patented lands and 480 acres in unperfected entries.

In the 5-mile strip surrounding the park there are patented lands aggregating 31,535.98 acres, unperfected entries aggregating 13,890.16 acres, and lands granted to the State aggregating 4,920 acres. The Indian Office reports that there are no allotted lands in that portion of the Southern Ute Reservation lying within the 5-mile strip.

EXTENSION OF BOUNDARIES.

During the past year my attention was called to the desire of the Ute Indians to secure the Ute Mountain tract, situated at the far end of the Montezuma National Forest, and their willingness to relinquish therefor, for inclusion in the Mesa Verde National Park, the portion of the 5-mile strip surrounding the park and lying within the Southern Ute Indian Reservation. After conference with the superintendent of the Fort Lewis Indian School as to the feeling of the Ute Indians and the supervisor of the Montezuma National Forest, I have ascertained that the Ute Mountain contains no merchantable timber, that it is isolated from the remainder of the forest, and expensive to administer, and the supervisor recommends the elimination of the entire Ute Mountain division; the land within the "strip" is rough, arid, and of little benefit to the Indians, and practically inaccessible from the west side of the reservation, where most of them live, but this tract contains the largest and most important cliff dwellings, which could be administered to far greater advantage by their inclusion within the park proper. This strip which the Indians are willing to relinquish is worth something for pasture, but is not used by them for that purpose. They care a great deal for the Ute Mountain country, which is easy of access to all and is much used

as a summer range, and the Indians claim they never agreed to the relinquishment of this tract.

Legislation which will effectuate the above changes will be most satisfactory to all concerned, and will greatly facilitate the administration of the various services having jurisdiction.

RECOMMENDATIONS.

1. *Road building.*—The most pressing necessity in the development of the park is that of road building. The cost of excavating and repairing of ruins and of all other development work is made excessive by having to use pack animals for transportation, and the use of the park by visitors is greatly reduced on this account. The carriage road should be completed at the earliest possible moment so as to permit driving to all the principal ruins.

2. *Ruin work.*—The work of Doctor Fewkes in the excavation and repair of Spruce Tree House and Cliff Palace has greatly increased the interest in the park. It is now important that Balcony House and Peabody House should be similarly treated, so as to prevent further decay. These houses have suffered considerable deterioration through the natural action of the weather during the year and are in a dangerous condition at the present time. On account of the urgent necessity for completing the roads, the recommendation for the building of the custodian's house and telephone line formerly made are withdrawn for the present.

3. *Park rangers.*—On account of the large amount of money that has been spent on the excavation and repair of ruins, it is now necessary that there be a resident custodian in the park during all except the coldest winter months. It is therefore recommended that the head ranger be provided with a suitable cabin and required to live at Spruce Tree House for nine months in the year until the carriage road is completed, after which he should remain there all the year around. Such ranger should be paid not less than $90 per month. There should be another regular ranger at a salary of $75 per month to look after stock, guard the ruins from vandalism, and to serve as a guide for travelers.

4. *Legislation.*—The private holdings in the park should be eliminated, provision made for the inclusion of the Ute Indian Reservation lands within the strip in the park proper by exchanging the Ute Mountain tract therefor, and for the granting of privileges and use of revenues derived therefrom.

ESTIMATES.

The following estimates of appropriation required for the ensuing fiscal year have been submitted: Salaries of superintendent, regular park ranger, temporary rangers, and clerk during the tourist season, $3,600; incidental office expenses, telephone service, and office rent, $467.20; continuation of wagon road construction, $12,500; excavation and repair of ruins, $6,000; total, $22,567.20.

Respectfully submitted.

HANS M. RANDOLPH,
Superintendent.

The SECRETARY OF THE INTERIOR.

RULES AND REGULATIONS.

GENERAL REGULATIONS OF MARCH 19, 1908.

Pursuant to authority conferred by the act of Congress approved June 29, 1906, the following rules and regulations for the government of the Mesa Verde National Park, in Colorado, are hereby established and made public and extended as far as applicable to all prehistoric ruins situated within 5 miles of the boundaries thereof on Indian and public lands not alienated by patent from the ownership of the United States:

1. It is forbidden to injure or disturb, except as herein provided, any of the mineral deposits, natural curiosities, wonders, ruins, and other works and relics of prehistoric or primitive man, on government lands within the park or the ruins and other works or relics of prehistoric man on government lands within 5 miles of the boundaries of the park.

2. Permits for the examination of ruins, the excavation of archæological sites, and the gathering of objects of antiquity, will, upon application to the Secretary of the Interior through the superintendent of the park, be granted to accredited representatives of reputable museums, universities, colleges, or other recognized scientific or educational institutions, with a view to increasing the knowledge of such objects and aiding the general advancement of archæological science, under the conditions and restrictions contained in present or future regulations promulgated by the Secretary of the Interior to carry out the provisions of the act of Congress approved June 8, 1906, entitled "An act for the preservation of American antiquities."

3. Persons bearing archæological permits from the department may be permitted to enter the ruins unaccompanied after presenting their credentials to the superintendent or other park officer. Persons without archæological permits who wish to visit and enter the ruins shall in all cases be accompanied by a park ranger, or other person duly authorized by the superintendent.

4. The superintendent is authorized, in his discretion, to close any ruin on government lands within the park or the 5-mile limit, to visitors when it shall appear to him that entrance thereto would be dangerous to visitors or might result in injury to walls or other insecure portions thereof, or during repairs.

5. The superintendent is authorized, in his discretion, to designate the place or places to be used by campers in the park, and where firewood can be obtained by them. All garbage and refuse must be deposited in places where it will not be offensive to the eye or contaminate any water supply on the park lands.

6. It is forbidden to cut or injure any timber growing on the park lands, except as provided in paragraph 5 of these regulations; but dead or fallen timber may be taken by campers for fuel without obtaining permission therefor.

7. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be taken at all times to avoid setting fire to the timber and grass.

8. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than those prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will be permitted in the park only on written permission from the superintendent.

9. No person shall be permitted to reside permanently or to engage in any business on the government lands in the park without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion, and no pack trains will be allowed in the park unless in charge of a duly registered guide.

10. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; such lands, however, shall have the metes and bounds thereof so marked and defined as to be readily distinguished from the park lands. Stock may be taken over the park lands to patented lands with the written permission and under the supervision of the superintendent.

11. The herding or grazing of loose stock or cattle of any kind on the government lands within the park, as well as the driving of such stock or cattle over

the same, is strictly forbidden, except in such cases where authority therefor is granted by the superintendent.

12. The sale of intoxicating liquors on the government lands in the park is strictly forbidden.

13. Private notices or advertisements shall not be posted or displayed on the government lands within the park, nor upon or about ruins on government lands within the 5-mile strip surrounding the same, except such as may be necessary for the convenience and guidance of the public.

14. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

15. The act creating the park provides that any person or persons who may, without having secured proper permission from the Secretary of the Interior, willfully remove, disturb, destroy, or molest any of the ruins, mounds, buildings, graves, relics, or other evidences of an ancient civilization or other property in said park, shall be deemed guilty of a misdemeanor, and upon conviction before any court having jurisdiction of such offenses shall be fined not more than $1,000 or imprisoned not more than twelve months, or such person or persons may be fined and imprisoned, at the discretion of the court, and shall be required to restore the property destroyed, if possible.

Any person or persons guilty of such vandalism upon government lands within the 5-mile strip will be liable to a penalty of $500 or imprisonment of not more than ninety days, or both, in the discretion of the court, as provided in the act of Congress approved June 8, 1906, entitled "An act for the preservation of American antiquities."

16. The superintendent designated by the Secretary of the Interior is hereby authorized and directed to remove all trespassers from the government lands in the park and to enforce these rules and regulations and all the provisions of the act of Congress creating the same.

The Indian police and field employees of the General Land Office are required to cooperate with the superintendent in the enforcement of these regulations as regards the 5-mile strip surrounding the park.

REGULATIONS OF MARCH 19, 1908, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed on the government lands in the Mesa Verde National Park without authority from the superintendent of the park will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notices of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded should not be reclaimed within thirty days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after ten days' notice, to be given by posting notices in six public places in the park and two public places outside the park and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership; and if not so claimed within six months from the date of sale, such proceeds shall be turned into the Mesa Verde National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, and the name and address of the purchaser, the amount for which each animal was sold, and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent shall in each instance make every reasonable effort to ascertain the owner of animals impounded and give actual notice thereof to such owner.

REPORT ON THE EXCAVATION AND REPAIR OF CLIFF PALACE, MESA VERDE NATIONAL PARK, COLORADO, IN 1909.

INTRODUCTION.

SIR: In accordance with your request, and by the direction of the Secretary of the Smithsonian Institution, the excavation and repair of ruins in the Mesa Verde National Park were continued under my charge from May to August, 1909. This work was a continuance of the plan of operations at Spruce Tree House in 1908, and was limited to the largest and one of the most picturesque prehistoric ruins, known as "Cliff Palace.[a]" The rooms, courts, and terraces were completely excavated and the walls carefully repaired in such a manner that they will resist the destructive action of the elements for several years without additional expenditures.

GENERAL DESCRIPTION.

Cliff Palace lies in an eastern spur of Cliff Canyon, under the roof of an enormous cave which arches 50 or 100 feet above it. The floor of this cavern is elevated several hundred feet above the bottom of the canyon. The entrance faces the west, looking across the canyon to the opposite side, in full view of a great promontory, on top of which stands the ruin of an ancient pueblo, now a pile of fallen stones, partially concealed by a thick growth of cedar trees. The floor of the recess in which Cliff Palace is built is practically covered with buildings, some of which, specially those at each end, extend beyond the shelter of the cave roof. The total length of the Cliff Palace is approximately 300 feet.

About two-thirds of Cliff Palace is situated under the sheltering cave roof and is thus protected from rain or from water dripping from the rim of the canyon above. Whenever there is a heavy downpour on the mesa top the water falls over the cliff in a stream of considerable size, which precipitates itself into the trees a few feet in front of the outmost retaining wall of the central part of the ruin. While the greater portion of the drainage of the surface of the mesa in this neighborhood is thus thrown beyond the outer walls, smaller rivulets fall directly on the tops of the exposed southern and western extremities, working great injury to the aboriginal adobe masonry. To these rivulets, whose erosive power is much increased by the height of the fall, may be ascribed the almost complete destruction

[a] The sum of $4,360 was allotted for this work, my salary and traveling expenses being paid by an additional allotment by the Bureau of American Ethnology of the Smithsonian Institution.

of walls at the western extension of the northern end and the burial of subterranean chambers in the southern quarter. The streams also bring from above much earth and large stones, which have broken down walls and in places have buried them many feet deep.

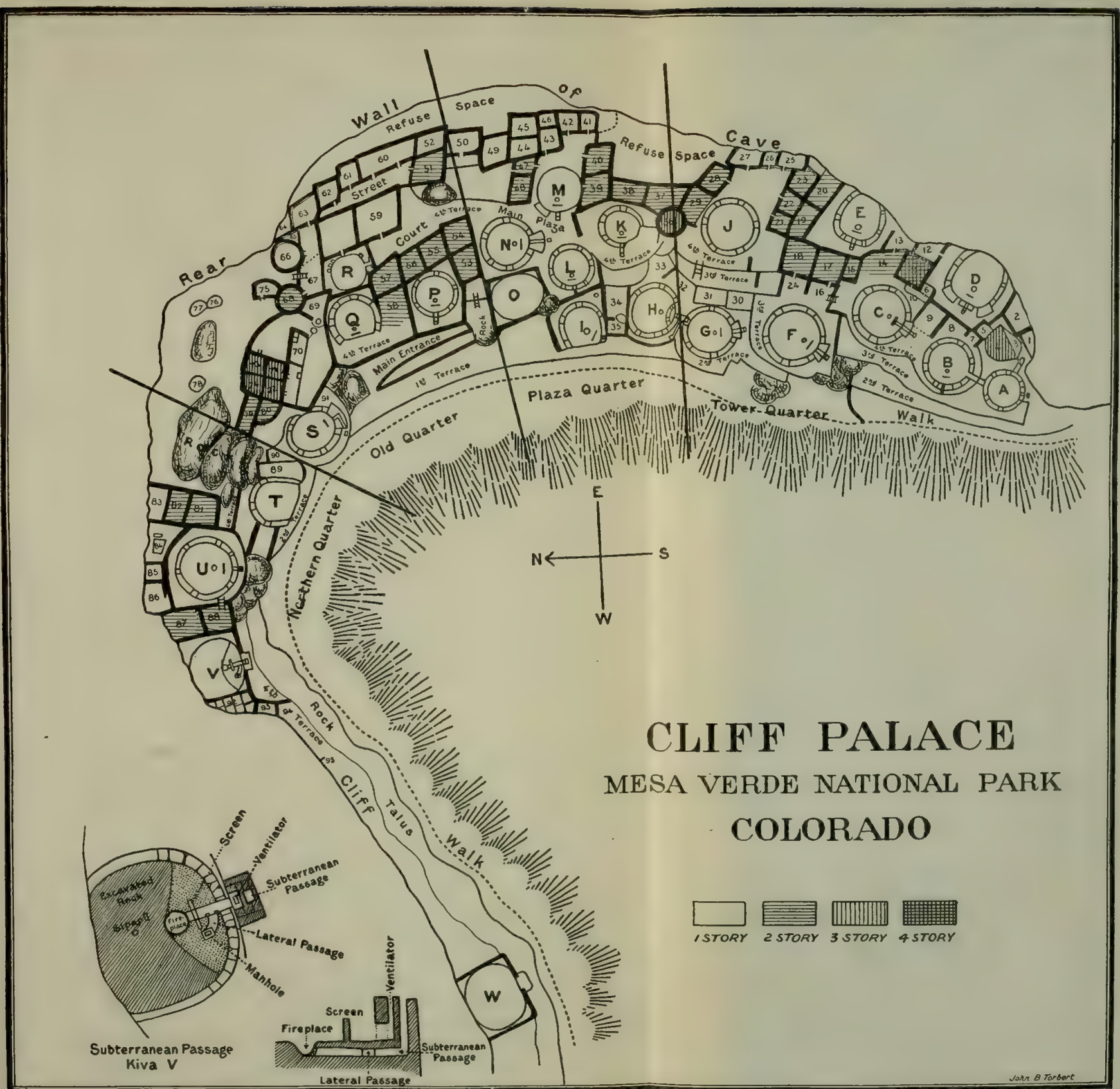
The underside of the roof of rock arching over Cliff Palace is comparatively smooth, exhibiting horizontal cleavage and plane surfaces. A break in this cleavage extends approximately north and south, forming a ledge a few feet in breadth. On its edge the ancients constructed a long wall, thus making a passageway between it and the solid cliff. Although now inaccessible from the ruin below, in ancient times this passageway could have been entered from the roof of one of the houses (66) through a doorway which is still visible. Similar ledge rooms are common features in Mesa Verde ruins.

The floor of the cave in which Cliff Palace was built had practically one level, determined no doubt by a layer of comparatively hard rock which resisted erosion more successfully than the softer strata above it. This floor was strewn with great angular bowlders that in the process of formation of the cave had fallen from the roof. These are too large to be moved by primitive man and must have presented to the ancient builders uninviting foundations upon which to erect their structures. The spaces between these rocks were better suited for their purpose. These were filled with smaller stones that could be removed, leaving cavities which could be utilized for the construction of subterranean rooms. The upper surfaces of the large rocks, even those which are angular, served as foundations for houses above ground and determined the levels of the plazas. From the bases of these rocks, which formed the outer edge of the level cave floor, a talus extended down the canyon side to the bottom. The rooms forming the front of the ancient village were constructed in this talus, and as their site was sloping, they were necessarily situated at lower levels on terraces bounded by retaining walls which are marked features in this part of Cliff Palace. At least three different terraces indicating as many levels are recognized. These levels are indicated by the rows of kivas, or ceremonial rooms, which skirt the southern and middle sections of the ancient village. At the southern end, where the talus is less precipitous and where, on account of the absence of a cave roof, the fallen rocks are smaller, the terrace with its subterranean rooms is on the level of the floor of the cave, having the same height as the foundations built thereon. At the western extremity the buildings were erected on the tops of huge rocks fallen from the roof of the cave. Here the talus is narrow or wanting and no rooms were constructed in front of these rocks. Thus the terrace rooms on the lowest level are found along the middle section of the cave, where the floor is highest and where the great fallen rocks still remain in sheltered places.

APPEARANCE OF RUIN WHEN WORK BEGAN.

When the excavation and repair work began these terraces and the rooms built in or above them were covered and concealed by stones that had fallen down the hill from walls of rooms above.[a] The

a The copyrighted photographs used in the preparation of Plate II, fig. 1, and Plate IV were furnished for publication by Mr. Frederick K. Vreeland. Plate V is from a photograph by Mr. R. G. Fuller.



SKETCH PLAN OF CLIFF PALACE.

mass of fallen material was so great that its surface sloped uniformly down the side of the precipice from the foundations of the rooms on the cave floor to the canyon below, and the huge rocks on which the rooms in the cave stood barely projected above the surface. The walls of subterranean rooms in the terraces were concealed by this mass of débris, their position being indicated only by slight depressions or by fragments of the tops of low walls. No sign of the main passageway or entrance into Cliff Palace was visible. It was difficult to walk along the front of the ruin over this accumulation of fallen stones 5 or 6 feet deep. The débris from former excavations had been thrown on the stones covering the terraces, through embrasures made in the walls for the purpose, thus increasing the amount of accumulated material. The sight of the work to be done was discouraging, as it seemed almost impossible to bring order out of the chaos of fallen stones and broken-down walls covered with débris in front of the ruin. It was difficult to tell where to begin work or how to discover foundations of rooms under the mass. A study of the situation soon revealed that the least difficulties presented themselves at the southern end and here excavation was begun, being gradually carried northward until the terraces and retaining walls of Cliff Palace were brought to light. The appearance of the rooms in the rear of the cave farther back under the roof was not so discouraging; here the ruin was in a better state of preservation, but even here were piles of stone and débris concealing subterranean rooms and covering floors of those above ground. Many walls had fallen and others were tottering. Great holes had been blasted in their sides and foundations were so undermined that in some instances they could be swayed back and forth by the pressure of the hand. Moreover, in many places it was dangerous for workmen to begin excavations, for buried foundations of sandstone, not very hard at best, had disintegrated. The process had gone so far in the subterranean rooms, especially on the lowest terrace, that the stones were practically softer than the mortar between them, being merely crumbling sand.

TRAILS TO THE RUIN.

The first work undertaken was to make the ruin more easily accessible from the mesa above, where camp was necessarily established. To do this a new trail was constructed a short distance from the southern end of Cliff Palace, following a rift between a huge detached rock and the side of the cliff. Near a series of foot holes (an ancient stairway) four ladders were placed one above another, firmly attached to the rock. These ladders were used throughout the summer by the workmen and now furnish visitors a means of easy descent from the mesa rim to the level of the ruin, many feet below. Incidentally, it may be said that the view of the western end of Cliff Palace from the head of this trail is superb. From its base an easy pathway, revealing attractive and picturesque outlooks on all sides, leads through the woods to the main entrance on a level with the lowest terrace. The steep part of the old trail, facetiously called "Fat Man's Misery," has been used ever since the discovery of Cliff Palace to descend to the ruin; this trail likewise follows an old Indian line of foot holes in the cliff and was not changed. From its lower end a pathway leads along the base of the western end of the cliff to the

ancient entrance to Cliff Palace. This part of the trail was improved by cutting down bushes, removing logs, and grading. Visitors descending this trail to the level of the ruin can, by following a comparatively level path to the main entrance, inspect the terraces and front walls from picturesque points.

The view of Cliff Palace from a point opposite its main entrance gives a striking impression of its great size. Ladders designed to facilitate progress through the ruin have been placed near the round tower, at the northern termination of the street, and at the western end. A ladder was also conveniently placed not far from the square tower. By means of a notched log placed in room six one can ascend the high wall in front of kiva D, one of the best known examples of cliff-house masonry, and from this elevation an outlook to the west may be enjoyed which embraces the most striking features of Cliff Palace.

A roof was constructed over the last room at the western end, in which are four well-preserved corn-grinding mills. This construction was necessary for their preservation, as they lie directly under a cleft in the cliff through which there is a downpour of water whenever it rains.

SCARCITY OF WATER.

When I arrived at Cliff Palace one of the first difficulties to be overcome was the total absence of water in the neighborhood. For the camp of 22 men about 20 to 30 gallons of potable water were needed daily, and for use in the masonry on the ruin below 50 gallons would barely suffice. The nearest source of water for camp purposes was Spruce Tree House, more than 2 miles away, and throughout the summer water was brought that distance daily on pack animals. For the water used in repair work a reservoir 15 feet deep was blasted in solid rock. In this was collected enough water for masonry during May and June. In July the supply failed, and it was necessary to construct another reservoir about a quarter of a mile from the ruin in a neighboring canyon. To transport this water a trail had to be made along the side of the canyon—not an easy task considering the precipice along which it was built. This source of water also failed in July and a large pothole on top of the mesa was cemented and walled in, the intention being to catch the rain and bring the water down the cliff through a hose. For several days the water for masonry work had to be brought from Spruce Tree House on pack animals. During August water was abundant everywhere on account of heavy rains.

VANDALISM AT CLIFF PALACE.

Probably no cliff dwelling in the southwest has been more thoroughly dug over in search of pottery and other objects for commercial purposes than Cliff Palace. Parties of "curio seekers" camped in the ruin for several winters, and it is reported that many hundred specimens therefrom have been carried down the mesa and sold to private individuals. Some of these objects are now in museums, but many are forever lost to science. In order to secure this valuable archæological material, walls were broken down with giant powder, often simply to let light into the darker rooms; floors were invariably

Fig. 1.—Before repairing.

Fig. 2.—After repairing.

CLIFF PALACE FROM THE NORTH.

opened and buried kivas mutilated. To facilitate this work and get rid of the débris, great openings were broken through the fine walls which form the front of the ruin. Beams were used for firewood to so great an extent that not a single roof now remains. This work of destruction, added to that resulting from the erosion due to torrents of rain, left Cliff Palace in a sad condition.

REFUSE HEAPS.

In the rear of the buildings—that is, in the deeper part of the cave—there is a dark recess filled with refuse that has never been removed, although pretty thoroughly dug over before systematic excavation and repair began. This refuse contains ashes, birdlime, cobs, stalks and leaves of corn, and many other rejects of the ancient population. The roof of the cave is badly smoked, as if great fires had once been kindled beneath. This recess is said to have been used as a cemetery, and it is reported that several human mummies have been found in it. Desiccated bodies of small animals, such as lizards, snakes, rats, and chipmunks, were unearthed from this refuse heap, but all human mummies had been removed.

In a walled inclosure at one end of this section was found a quantity of calcined human bones accompanied by mortuary objects, as dippers, vases, and small food bowls. From the smoke on the roof and the presence of burnt bones it appears that cremation was practiced at Cliff Palace. As a rule the cliff dwellers inhumated their dead, returning them to "Mother Earth" in the posture they had before death. Mummification resulted from the action of natural agencies in the dry soil in which the bodies were interred.

METHOD OF REPAIR WORK.

It was found, as was to be expected, that the repair work on Cliff Palace was of much greater magnitude than that on Spruce Tree House last year. Cliff Palace is three times as large as the latter ruin, and the problem of its preservation was much complicated by the terraced front.

The method of treatment was essentially the same as that followed at Spruce Tree House. No attempt was made to restore the buildings, the rooms being merely cleaned out and their broken foundations repaired in order to preserve the original lines as far as possible. Repair work was devoted principally to the walls to prevent their further destruction. In some instances it was found necessary to construct buttresses to hold up tottering walls or strengthen foundations.

One corner and more than half of the two adjacent sides of the four-storied building had to be reconstructed from the level of the floor of the adjoining kiva, in order to prevent the fall of the two upper stories, on one of which are preserved the finest examples of mural paintings in Cliff Palace. This building undoubtedly would have fallen within six months but for this work.

EDUCATIONAL IDEAL.

As far as possible I endeavored to increase the educational value of Cliff Palace and to develop it into a "type ruin." It is well adapted for this purpose, being the largest cliff house known and

containing most of the architectural features of this type of prehistoric buildings. It has circular kivas of two kinds, round and square towers, circular and rectangular secular rooms of all kinds, terraces, and retaining walls. The kivas present all the variety of detail characteristic of cliff-houses. Anyone familiar with the Cliff Palace as now repaired has a type for interpretation of all other cliff ruins in the Mesa Verde National Park, and for comparison with those situated outside this area.

GENERAL DESCRIPTION OF THE REPAIRED CLIFF PALACE.

Fortunately the configuration of the cliffs above the ruin makes it possible to get a fine bird's-eye view of Cliff Palace from the rim of the mesa. Views obtained from the heads of the two trails are most striking and should be enjoyed before closer examination and detailed study of the rooms in Cliff Palace. To obtain the best general view of the whole ruin from the front one may cross the canyon and climb a promontory whence Cliff Palace appears to be set among trees in a rocky frame, the lower side being the precipice beneath and the upper the roof above.[a]

ANCIENT ENTRANCE.

Deep under the débris which covered the lower terrace of Cliff Palace there was brought to light by excavation an ancient way, hitherto unknown, which leads by a gradual slope to the center of the village. This pathway extends parallel with the high front wall of kiva O, and, passing to a large rock in which foot rests were cut, enters Cliff Palace through a narrow court between high walls. From this court ascent to the level of the cave floor was accomplished by means of a ladder, which could be drawn in when danger necessitated. The floor of the main entrance was hardened adobe, the outer edge of which was held by a roughly laid retaining wall resting at the lower end on logs still well preserved. This main entrance may have led formerly to the village spring in the canyon below, now dry, and along it no doubt in ancient times toiled the weary women with jars of water on their heads.

GROUND PLAN OF REPAIRED CLIFF PALACE.

An examination of the correct ground plan of Cliff Palace, here for the first time published, shows that the houses were arranged in a crescent, the northern extension of rooms corresponding roughly to one point. The curve of the village follows, generally speaking, that of the rear of the cave in which it was constructed. There is little regularity in the arrangement of the rooms, which, as a rule, are not crowded together; most of the subterranean chambers are situated on

[a] Just opposite Cliff Palace there stands on or near the point of the mesa a pueblo ruin which, but for the thick grove of cedars, could plainly be seen from the opposite canyon rim. The site of this pueblo, except for the trees, recalls sites of Hopi pueblos. Its walls where dug out are in good condition, although formerly covered with rocks. If it were excavated and repaired it would present an instructive object lesson in comparative studies of cliff dwellings and pueblos situated in the open mesa tops, a type well represented in the Mesa Verde National Park.

Fig. 1.—Front walls, after repairing.

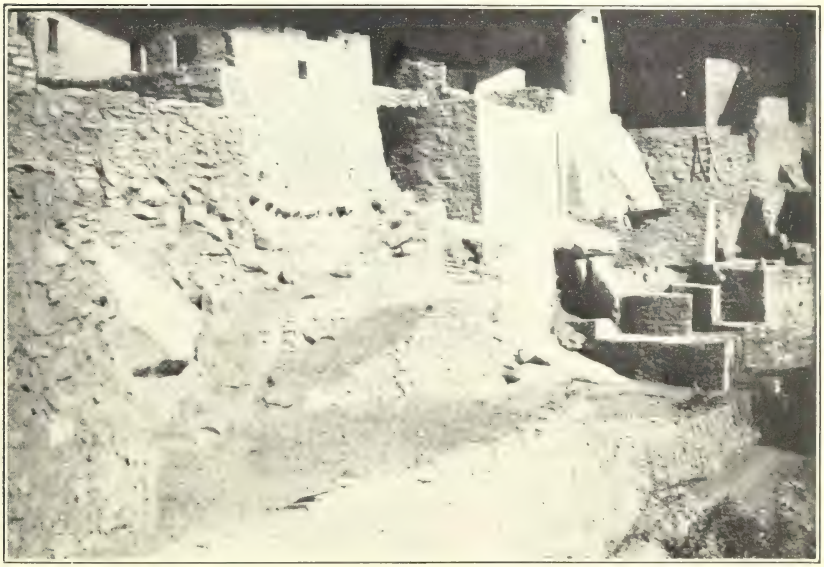


Fig. 2.—Main entrance, after repairing.

MIDDLE REGION OF CLIFF PALACE.

terraces in front of the secular rooms. There is one passageway that may be designated a street; this is bordered by high walls over which a passer-by could not look. No open space of considerable size is destitute of a ceremonial chamber, and the largest court contains five of these rooms. It is not possible to count the exact number of rooms that Cliff Palace formerly had, as many upper stories have fallen and a considerable number of terraced rooms along the front are indicated only by fragments of walls. Roughly speaking, 200 is a fair estimate.

It is instructive to note that although Cliff Palace is about three times as large as Spruce Tree House, judging from ceremonial chambers, it has no more than double the number of secular rooms.[a]

The most striking addition to our knowledge revealed by the excavations at Cliff Palace is a more accurate ground plan of this village. This enlarged knowledge is effectually shown by a comparison of my plate [b] with that given by Nordenskiöld. The most important discoveries were made in the course of excavations at the southern and northern ends and on the terraces, where great accumulations of débris had concealed existing walls from former students. In place of 17 ceremonial rooms ("estufas") represented by Nordenskiöld in his ground plan 23 may now be counted. He makes no reference to the kiva situated a short distance from the western end of the ruin and missed the series on the terraces at the south end.

CLIFF PALACE SUBDIVISIONS.

In order to facilitate description of the Cliff Palace as repaired, it is here arbitrarily divided into certain quarters or sections. The front entrance, being situated about midway of the length of the village, is naturally a point of division of the ruin into halves.[c]

Four different regions may be distinguished in the ruin, two north of a line drawn from the front entrance to the rear of the cave and two south of that line. While structurally there appear to be no essential differences in these quarters, they present certain characteristic archæological features which are worthy of consideration.

The part of Cliff Palace extending northward from the main entrance to the point where the ruin turns westward lies in the deepest part of the cave and may be called the "Old Quarter." Its northern end is formed by a castellated building three stories high, constructed of the finest masonry and perched on a huge fallen rock. This building contains several rooms, story above story, the uppermost reaching to the roof of the cave. It may be called the "Speaker Chief's House" from a banquette on one side overlooking the whole southern end of the ruin.

The extension of Cliff Palace westward from the Speaker Chief's House to the end of the ruin may be designated the "Northern Quarter." About 50 feet beyond the extreme western end stands above ground a solitary building, or ceremonial room, of singular construc-

[a] This is explained on the theory that Cliff Palace is more ancient than Spruce Tree House, the kivas being the older rooms and probably more strictly limited to the use of clans, while at Spruce Tree House they are more in the nature of fraternity rooms, the membership of the priesthood occupying them being drawn from several clans.

[b] The sketch ground plan here published was made under my direction by a voluntary assistant, Mr. R. G. Fuller, who served as photographer of the party.

[c] The quarters into which Cliff Palace is divided were possibly sociologically different.

tion.[a] The part of the ruin from the main entrance to the Round Tower contains five ceremonial rooms huddled together. Their roofs and the intervening spaces formerly constituted the most extensive plaza in the village, and it seems appropriate to call this the Plaza Quarter.

The part of the ruin from the Round Tower to the extreme southern end is divided into halves by the Square Tower, a four-storied room with painted walls.

To recapitulate, there are here recognized in Cliff Palace the following quarters:

1. Northern Quarter, from Speaker Chief's House to west end.
2. Old Quarter, from Speaker Chief's House to entrance to ruin.
3. Plaza Quarter, from village entrance to Round Tower.
4. Tower Quarter, from Round Tower to southern end.

NORTHERN QUARTER.

This quarter contains four ceremonial rooms and accompanying secular inclosures. On the western end it has a room fitted up with four corn-grinding bins (*metakis*), a second room with one *metaki*, and two cooking rooms.

This quarter is built on two levels, the lower adjoining the Old Quarter having fine masonry composed of well-dressed building stones. The higher level has two kivas, the more western of which shows in its floor the most extensive example of excavation in solid rock known in Cliff Palace. For more than two-thirds of its area the floor is here cut down on one side about 2 feet. The whole western section was considerably mutilated and was covered with small building stones and débris when the excavation and repair work began. This is obscurely indicated on previously published ground plans in which its rooms are not accurately represented.

OLD QUARTER.

The region northward from the main entrance of the Cliff Palace, including the lofty castellated building called "Speaker Chief's House," may be known as the "Old Quarter." This contains many secular rooms, some of which are round and others rectangular, and three fine ceremonial rooms, one of which is of a type rare in cliff-dwellings. The Old Quarter falls naturally into two regions, the Speaker Chief's House and the section adjoining the main entrance. A street extending north and south divides this quarter into a front and a rear section.

It seems probable that the Old Quarter was inhabited by the oldest and most influential clans of the pueblo. The masonry of the Speaker Chief's building is not only the finest in Cliff Palace, but compares well with that laid by white masons. The walls throughout were built of hewn stones, ground plane, carefully laid and smoothly plastered.[b] The main building was erected on the inclined face of a very high, angular rock, unfortunately cracked, by which

[a] Probably belonging to the second type of ceremonial rooms later described.

[b] It is sometimes stated that the cliff dwellers rarely dressed or smoothed the stones out of which they constructed walls. While this may be true of some cliff dwellings, it is not true of those on Mesa Verde.

CLIFF PALACE FROM THE SOUTH, BEFORE REPAIRING.

CLIFF PALACE FROM THE SOUTH, AFTER REPAIRING.

the foundations are raised above neighboring buildings and terraces. The castellated part extends to the roof of the cave and is three stories high. On the north side the wall of this part is curved, but on the south side there is a banquette or platform to which one mounts by a single step. The whole central and southern parts of Cliff Palace lie in full sight of this platform, and we may suppose that a Speaker Chief stood upon it every morning when he announced the events of the day.

In addition to the three-storied castellated building there are included in the Old Quarter four fine ceremonial rooms and two circular rooms that lie deep in the cave.

The southern part of the Old Quarter, that adjoining the entrance to the village, has one ceremonial room and several secular inclosures. The " street " lies almost wholly in this section.

PLAZA QUARTER.

Almost the whole of this quarter is occupied by a large open space containing five kivas. These subterranean rooms are so close to one another and are so arranged that their roofs must have formed an almost level plaza, which was the central and largest open place of Cliff Palace. Two kivas, I and H, on the lower terraces, likewise belong to this quarter. In addition to the subterranean rooms on the upper level, there extends from it into the Old Quarter a court into which opens the " street." It may well be supposed that the Plaza Quarter was one of the most frequented breathing places in this cliff-dwelling when inhabited. Here we find a broad open place fitted for ceremonial dances, into which opened the only large court and street of the village. The main entrance to Cliff Palace was situated at its northwest corner. It was well protected in all seasons of the year by the overhanging roof of the cave and the massive walls surrounding it on three sides. The outlook from its western side across Cliff Canyon is one of the finest. Situated midway between the two ends of the village, near the center of population, the Plaza Quarter must have been a much frequented place when Cliff Palace was inhabited, and may well be called the chief quarter.

TOWER QUARTER.

The Round Tower section includes the ceremonial rooms E to G and the secular buildings 13 to 33. Of the former, F and G lie at lower levels in front of the foundations of the Round Tower. Kiva J is situated on a high level, and E is built near the cliff in the rear of the village.

The most striking architectural feature of this quarter is of course the picturesque Round Tower, a symmetrical structure perched on top of a huge rock. The use of this tower is unknown, but we can hardly suppose so important a building was built in this commanding position for purely secular purposes.

The southern end of Cliff Palace, including rooms 1 and 10, and the subterranean chambers A to D, is somewhat exposed to the weather and therefore much worn. Kivas A to C lie in the open in front of the rooms and outside the rim of the roof. The walls of kiva D, among the finest known in cliff dwellings, are painted yellow

and have the superficial plastering well preserved. The Square Tower (11) is four stories high and has fine mural decorations in white and red on the inner walls of the third story. The whole northwest angle of this tower had to be rebuilt to support the walls of this story.

CLASSIFICATION OF ROOMS.

The arrangement of houses in a cliff dwelling of the size of Cliff Palace is characteristic and intimately associated with the distribution of the social divisions of the inhabitants. The population was composed of a number of units, possibly clans, each of which had its own social organization more or less distinct from others, a condition that appears in the arrangement of rooms. The rooms occupied by a clan were not necessarily connected, although generally neighboring rooms were distinguished from one another by their uses. Thus each clan had its men's room, which was ceremonially called the "kiva." Here the men of the clan practically lived, engaged in their occupations. Each clan had also one or more rooms, which may be styled the living rooms, and other inclosures for granaries or storage of corn. The corn was ground into meal in another room containing the metate set in a bin or stone box, and in some instances in fireplaces, although these were generally placed in the plazas or on the house tops. All these different kinds of rooms, taken together, constitute the houses that belonged to one clan.

The conviction that each kiva denotes a distinct social unit, as a clan or a family, is supported by a general similarity in the masonry of the kiva walls and that of adjacent houses ascribed to the same clan. From the number of these rooms it would appear that there were at least 23 social units or clans in Cliff Palace. The kivas were the rooms where the men spent most of their time devoted to ceremonies, councils, and other gatherings. In the social conditions prevalent at Cliff Palace the religious fraternity was limited to the men of the clan.

Apparently there is no uniformity in the distribution of the kivas. As it was prescribed that these rooms should be subterranean, the greatest number were placed in front of the rectangular buildings, where it was easiest to excavate them. But when necessary these structures were built far back in the cave and inclosed by a double wall, the intervals between whose sections were filled with earth or rubble to raise it to the level of the kiva roof. In that way they were artificially made subterranean, as the ritual required.

CEREMONIAL ROOMS.

The majority of the ceremonial rooms in Cliff Palace are accompanied by rectangular chambers, but one of the former, situated about 50 feet from the wetsern end, has no rooms near it. The ceremonial rooms naturally fall into two types: (1) Subterranean kivas having banquettes around their sides, separated by roof supports called pedestals; (2) kivas destitute of banquettes or pedestals, probably roofless, their roofs being replaced by high surrounding walls. Twenty ceremonial rooms have been referred to the first type, two or three to the second. The isolated kiva resembles in many particulars the

other examples of the second type.[a] The shape of the kivas varies from circular to square with rounded corners. Their architecture varies somewhat and their depth is not uniform. The walls are well constructed and generally show signs of plastering, often blackened with smoke. One of the kivas is painted yellow; the lower part of another is red with triangular decorations on the upper border.[b]

KIVAS OF THE FIRST TYPE

The Cliff Palace kivas, provided with pedestals or roof supports, furnish examples of some of the finest masonry in prehistoric buildings of our Southwest. Owing to their subterranean position it was often necessary for the builders to excavate the floors in solid rock and the curves of the sides were obtained in many instances by removing projecting ends of huge rocks. The number of pedestals vary in different kivas. In the majority there are six of these roof supports; the kiva in the Speaker Chief's section has eight, others four, and one has but two. The number of banquettes necessarily varies with the number of pedestals; one called the altar banquette is commonly larger than the remainder. This large shelf may be the place where ceremonial paraphernalia were placed; in most cases it is situated in the same side as the air shaft or ventilator. Every kiva of the first type has a ventilator, firehole, and deflector, as explained in my report on the repair work at Spruce Tree House.

Although these structures are represented in every kiva the configuration of the walls of many kivas made it difficult to introduce the ventilator on the same side or in the same form. In one case the passage turns at right angles before it joins the vertical so-called ventilator. In another instance this vertical passage is situated like a chimney at one angle of the outside wall and in still another it opens through a roof support.[c]

Deflectors in Cliff Palace kivas have four modifications: (1) A slab of stone placed upright; (2) a low stone wall; (3) a curved wall joining the wall of the kiva on each side of the lateral entrance into the ventilator; (4) a row of upright sticks having twigs woven between them, the whole being covered and hidden with clay mortar. Thus all varieties of deflectors discovered in Mesa Verde ruins are represented at Cliff Palace.

Every kiva of the first type has a fireplace near the center of the room, which is generally found to be packed solid with wood ashes: in some cases the sides are rimmed with flat stones, one stone smaller than the rest sometimes projecting slightly above the level of the floor. The symbolic opening (*sipapû*) in the floor is not found in all Cliff Palace kivas. It is rarely absent; usually it is situated slightly to one side of the middle of the floor. In one kiva the opening is double and in another room this hole lies near the wall. Even when necessary to drill into solid rock the ancients did not hesitate to make this ceremonial opening, which, in some instances, was lined with a burnt clay

[a] At Spruce Tree House there are 8 kivas of the first type and 1 of the second.

[b] Similar decorations occur likewise on the pedestals of kiva A of Spruce Tree House and on the inner walls of the third story of the Square Tower.

[c] In the kivas of some of the cliff dwellings in Navajo National Monument a doorway occupies the position of the lateral entrance of the ventilator into the kiva. These kivas are rectangular and are exceptional in having entrances opening laterally instead of vertically.

tube. For the reception of small objects diminutive niches were constructed in the walls of almost every kiva and vases are now found inserted in the banquettes of a few of these chambers.

Each kiva possesses special characters, notwithstanding that all the kivas have a general similarity. The former roof of the most southerly kiva (A), one of those on a terrace in front of the buildings, was on a level with their foundations and measures 11 feet in diameter; it has a subterranean passageway, with steps leading to the floor of the most southerly room of the ruin.

Another passageway communicates with kiva B, which lies to the north at the same level. The diameter of kiva B is 13 feet. Its masonry is somewhat better than that of kiva A. A large banquette lies over the lateral passage, which communicates with the ventilator.

Kiva C, the third ceremonial room at the southern end of the ruin, is also 13 feet in diameter; the roof was about level with the preceding roof; its walls are well made and apparently plastered.

Not all of these ceremonial rooms are circular, some being square with rounded corners. To this group belongs kiva D, also 13 feet in diameter, whose plastered walls, painted yellow and somewhat blackened with smoke, are still preserved. The masonry of this room needed no repair, being practically as good as any in Cliff Palace. One side is formed almost entirely by the cave wall; it is protected above by the cave roof and is hidden from outside by rooms with high walls.

Kiva E is also sheltered by the roof of the cave and protected from rains by secular rooms in front of it. There has been considerable excavation in the rock, to lower its floor to the desired depth. This kiva measures 11 feet in diameter. An exceptional feature in this chamber is a rough-ware vase set in the firehole, which in other respects is normal in position and construction. No ceremonial opening was detected by a thorough examination of the floor of this room.

Evidences of fire are found on the walls of kiva F, which is square with rounded corners. It measures 13 feet in diameter.

The kivas above mentioned, that are situated in front of the cave and outside the protection of its roof, are exposed to the direct effects of rain or of water dripping from the rim of the canyon. To prevent further injury to the walls of these kivas, it was necessary to cover their upper surfaces and the adjacent plazas with Portland cement and to provide them with runways and spouts to carry off the excess water which in heavy rains falls upon them and endangers their masonry. It was necessary, also, to treat exposed neighboring walls with the same material. This work was expensive, because the cement had to be brought from a great distance; but there was no other way of protecting the kivas outside the walls at the southern end of the ruin from heavy rains except roofing the entire end.

Kiva G is 12 feet in diameter. It has two ceremonial openings in the floor.

In Kiva H the ventilator is built up on the outside on one corner; it has a turn at right angles where the lateral passage joins the vertical. Unlike any other kiva in Cliff Palace, this chamber is connected with a small room by a doorway. This room, part of whose roof is still intact, probably served as a receptacle for ceremonial paraphernalia.

Kiva I, situated on the lowest terrace in front of the middle of the village, was completely buried under débris thrown through a break in the wall of the ruin, made for that purpose. Owing to the fact that it had been so long under ground, the stones in its walls were very soft and some of them had become sand. The whole front of this kiva was destroyed, but on the walls that remained red decorations are clearly visible, especially on the inner surfaces of the niches found in the north side. In a covered vase set in the wall of this room, at the level of the former floor, were found several dried lizards.

Kiva J, measuring 14 feet in diameter, is one of the large ceremonial rooms. It is situated at the level of the cave floor and is surrounded by well-preserved rooms with high walls. Its banquettes number six, one of which is relatively very large.

Kiva K is one of the smallest ceremonial rooms in Cliff Palace. It was excavated practically out of rock, being enlarged by hewing out fallen fragments of the cliff. On its blackened walls are found indistinct scratches or outlines of animals or of human heads, which when interpreted may add a new chapter to our knowledge of the old life of the Mesa Verde canyons. These random inscriptions were made by some old priest, either to wile away the tedious vigils between ceremonies, or they may have some connection with particular rites once performed in this kiva. The diameter of kiva K is 9 feet; the chamber contains only five roof supports or pedestals. In the blackened walls are inserted eyelets of unknown uses, made of osiers. The deflector of this kiva consists of upright sticks interlaced with small willow twigs, the whole being plastered over with adobe cement—a unique way of making this part.

Kiva L is round in form and measures 12 feet in diameter. This room was in bad condition, especially on the west side where a breach had been made in order to dispose of the débris that had been dumped into it from back rooms. So far destroyed was this kiva that it was impossible to determine the floor level. The large break in the west wall, whose foundations extend to the depth of the kiva below, was repaired. The chamber was excavated to what was supposed to be the floor level and numerous weak places in its walls were strengthened.

All kivas of the first type, except kiva M, have roof pedestals, but in this room they are wanting. The form of its deep banquette leaves no doubt that the kiva should be referred to the first type, with which it is structurally related. Since its pedestals are missing, the method of roofing kiva M is unknown. Much work had to be done in repairing this room. The whole south side had fallen, and a wall of a neighboring room, which formerly depended on it for support, had tottered over this side. To save this wall it was necessary to erect a buttress extending under its foundations from the floor of the kiva.

Kiva N is finely made, almost filling the space at the north end of the chief plaza of Cliff Palace.

The walls of O, a ceremonial room of the second type, on the west side, are massive, while those on the north form the sides of the narrow court which is the main entrance to the pueblo.

The inclosure P is almost completely filled by the subterranean room, kiva P, whose floor rests on cedar logs, the ends of which project through the west wall just above the main passageway into Cliff Palace. It is evident that the foundation at this place was far from level and that these logs had been laid from a wall deeper in the cave to one in front of it in order to form a level surface on which to construct the kiva floor.

The best masonry in Cliff Palace, as elsewhere mentioned, is in the Speaker Chief's Quarter, and the two kivas which belong to it show fine specimens. Kiva Q belongs to the first type; R to the second (those without roof supports).

The whole west wall of kiva Q, containing the ventilator, is broken down, but the fireplace and the deflector remain, showing that it was like other kivas in Spruce Tree House and Cliff Palace. There may have been eight roof supports in this kiva instead of the usual number six. The masonry of walls, banquettes, and roof supports is exceptionally good. Not only were the component rocks dressed into shape, but there is evidence that, after having been laid, their surfaces were smoothed by rubbing before being plastered. Although the floor is well preserved, the ceremonial floor opening was not found; a broken place slightly to one side of the center may indicate the position of this important feature.

The ceremonial room, kiva S, is situated on a lower terrace than that last mentioned, partially beneath the great rock upon which the foundations of the Speaker Chief's House rest. Considerable repair work was required to put it in good condition, the chamber being wholly buried under fallen rocks and more or less demolished.

On excavation the entire south side of the small kiva T was found to have been destroyed, but the wall that remained shows fine masonry.

Kiva U, situated at a higher level than the last two named, is one of the largest in the whole ruin. Although one of the most badly damaged, it was put in good repair, and, while somewhat exposed to southeastern storms, may be preserved for many years.

The floor of kiva V presents the most extensive example of rock excavation in Cliff Palace. In this room the solid rock, which is hard and compact, had been cut down on the northern side by the ancient builders to a level 2 feet below its former surface, the excavation embracing about two-thirds of the area of the room. A ceremonial opening was drilled into the rock to the depth of an additional foot and lined with burnt clay. This kiva possesses another unique feature. Below the floor is a subterranean passageway barely large enough to admit a man's body, extending from the bottom of the firehole to the outer wall. This passage, which lies below the ventilator, has a lateral branch, also under the floor of the room, opening into the chamber through a manhole. The object of these subterranean passages is unknown,[a] but they are probably ceremonial.

Kiva W is situated some distance west of the western end of Cliff Palace and is not accompanied by secular rooms. The first impression would be that of a rectangular room above a circular kiva, but W is evidently a kiva of the second type, the imposing wall rising high above it being similar to those always found with rooms of this type.

[a] This passage should not be confounded with the ventilator, which is present here as in other ceremonial chambers of the same type.

KIVAS OF SECOND TYPE.

There are two, possibly three, ceremonial rooms that show no signs of roof supports or pedestals, no evidences of fireplaces, deflectors, or ventilators. It would appear that these rooms were used for the same purpose as kivas of the first type.[a] They have banquettes on the side wall, quite wide at each end and generally a lateral passageway at the floor level.

The existence of two types of ceremonial rooms in Cliff Palace may indicate a division of the ritual into two distinct parts performed by the summer and the winter people, respectively, a specialization still perpetuated among some modern pueblos. The best example of the second type is kiva R, situated in the Old Quarter of the ruin in the neighborhood of the Speaker Chief's House. No signs of pedestals are to be found, but broad banquettes occupy the northern and southern ends, connected on the other sides by a narrow shelf. In the side walls below the banquettes are several recesses or cubby holes, and there is a lateral entrance on the floor level in the southern side, which sends off side branches under the banquette, but no indication was discovered of a vertically placed ventilator.

The walls above this kiva were built high, as if to prevent observation by outsiders; there was probably no roof.[b]

SECULAR ROOMS.

Secular rooms in Cliff Palace may be classified as follows: (1) Living rooms; (2) storage rooms; (3) mill rooms; (4) granaries; (5) dark rooms of unknown use; (6) towers, round and square; (7) round rooms not towers. The highest rooms have four stories; there are several of three stories, many of two, but the majority have only one. Walls projecting at right angles to the foundations in front of the ruin on a level below the cave floor indicate that in this part Cliff Palace was terraced, consisting of several-storied houses and terraces at different levels. There is little uniformity in size, shape, or character of the walls of secular rooms. In rare instances they extend to the roof of the cave, a feature sometimes shown by markings or fragments of masonry on the rock surface.

LIVING ROOMS.

Several rooms show such marked evidences that they were inhabited and used as sleeping places that they are called living rooms. One or two of these have each a banquette extending across one side and several have fireplaces in the floor in one corner. The inner walls of these rooms are generally smoothly plastered, sometimes painted. They contain small niches, and in one case pegs on the walls on which blankets or kilts could be hung. These chambers are supposed to have been the sleeping rooms for women and children, and although not living rooms in one sense, they are the nearest approach to them

[a] A similar room in Spruce Tree House was called, in my report on Spruce Tree House, a "warrior room," without sufficient reason.

[b] Nordenskiöld's comments on this chamber as a connecting link between circular and square kivas are not convincing. In origin square kivas were independent of circular kivas and the indications are that in some cases the former had lateral openings or doorways.

in Cliff Palace. Much of the daily work—pottery making, cooking, etc.—was done on house tops or in open places adjoining the living rooms.

MILL ROOMS.

Several special rooms set apart for mills in which corn was ground were discovered in different quarters of Cliff Palace. These differed from some other rooms only in being smaller. Almost the whole space was occupied by rude stone mills of characteristic forms. These consist of boxes made of slabs of rock set upright, in each of which was placed an inclined stone, the mealstone (*metate*). In front of this, at the bottom of the mill, is a receptacle into which the meal fell after it had been ground by hand by means of a slab of stone called the *mano*. The women or girls who ground the corn knelt on the side of the mill at the top of the metate and rubbed the mano over the metate (mealstone) until the corn between was ground. In one of these mill rooms there were two and in another four of these mills set in a row side by side. The surfaces of the metates in this series are graded in roughness, so as to grind the meal finer and finer as it was passed from one to another. The mills were so well preserved that even the fragments of pottery in the angles of the receptacles in which the meal collected after grinding were still in place, and the upright stones on which the girls braced their feet had not been moved. The brushes with which the meal was brushed into baskets after grinding had been left in the mills and were still in good condition.

STORAGE ROOMS.

The smaller rooms and the back chambers, many of them darkened by their position in the rear of other rooms, were probably used for storage of corn. These diminutive rooms, many having the form of cists, are carefully built; many are erected on flat rocks, but have doorways. Every crevice and hole in the corners of these granaries was carefully stopped with clay, no doubt to prevent rats or squirrels from entering. The impression prevalent in some places that the inhabitants of Cliff Palace and of other cliff dwellings were of diminutive size is supported by the erroneous belief that these rooms were used as dwellings. If we had visited Cliff Palace when inhabited we should probably have found in these storage rooms corn on the cobs stacked in piles, from which the daily consumption was drawn. The living rooms were often small, but they were unencumbered with furniture or even with food in great quantities, and were ample for people of small stature. The cliff dwellers were not pigmies.

ROUND TOWER AND ROUND ROOMS.

The most prominent and picturesque building in Cliff Palace is the Round Tower, situated about midway in its length on a high angular rock, which raises it in full view above all the terraces. This tower is not the only round room in the ruin, for there are foundations and walls of two other circular rooms not far from the Speaker Chief's House at the north end of the "street." These are inconspicuous because hidden far back in the cave behind more lofty walls.

The Round Tower, formerly two stories high, was entered from the north side. It was little damaged during the centuries elapsing since Cliff Palace was abandoned and needed little repair. The walls show most beautiful examples of aboriginal masonry, perhaps the finest north of Mexico. Almost perfectly symmetrical in form, the stones that compose the walls are skillfully dressed, fitted to one another, and carefully laid. This tower was evidently ceremonial in function, or it may have served as an observatory, for which purpose it is well situated. The presence of small peepholes through which one can look far down the canyon supports the theory that the tower was a lookout, to which theory its resemblance to other towers in the Mesa Verde region likewise contributes.

SQUARE TOWER.

This building also is one of the picturesque and prominent structures at the southern end of Cliff Palace. It is four stories high, the walls reaching from the floor to the roof of the cave. The walls of the third story are painted white and red with decorative symbols, as triangles, zigzag lines, and parallel lines, perhaps representing feathers. When work began on this tower the whole northwestern angle had fallen and the wall of the "painted room" was tottering and in great danger of falling. The repair of this section was dangerous as well as difficult, one whole corner having to be rebuilt from the bottom of an adjacent kiva. This undertaking was not the least hazardous work done on Cliff Palace last summer.

LEDGE ROOMS.

A projecting ledge in the cave roof, about 20 feet above the top of the highest wall, served as the foundation of a marginal wall and accompanying rooms. This wall is pierced by doorways, windows, and peepholes. One of the doorways, probably an entrance situated near the northern end, was apparently on the former level of the roof of one of the round rooms of the Old Quarter of the pueblo. The outer surface of the marginal wall is decorated with a white terraced figure, suggesting the white figure overlooking plaza C in Spruce Tree House. The ledge rooms, which occur in several Mesa Verde ruins, were probably used for storage or for protection.

CONSTRUCTION OF WALLS.

The character of the masonry of Cliff Palace varies greatly in different quarters, being fine in certain rooms and poor in others. As a rule the walls are constructed of dressed stones mostly of small size, some smoothed by rubbing their faces after they were laid. Usually the corners were not bonded or tied and small rubble was used for foundations. In places, specially where a wall approaches the roof of the cave, the junction was made by means of flat slabs of stone set on edge.

This variation in character of workmanship may be traced to the varying skill of different clans, for while some clans had skillful stone masons, the artisans of other clans were poor or indifferent. The erection of buildings was largely a clan affair, there being no special group of workmen who performed this duty for the whole

village. On account of this fact it is often possible to tell what walls were constructed by the same clan. For instance, all the rooms near the Speaker Chief's House share fine masonry with it. The foundations of many high walls were very poor, indicating that there was no intention when they were laid of constructing such walls upon them. Here thin slabs were set on edge or foundations were placed on ashes or sand. Foundations were laid also on slanting surfaces of fallen rock inclined at considerable angles; necessarily in course of time such constructions slid down the incline and the wall was thus destroyed. This was not always the case, however, for in some instances steps were cut in the incline to secure a good base. Often logs were laid as foundations, either to level a floor or to bridge two rocks, as necessitated by the site of the building.

The width of walls varies greatly. None are perfectly plumb or straight and no rooms are perfectly circular, square, or rectangular. The foundations are thicker in places than the upper part, many offsets being visible as low shelves or ledges. Large stones are more common in foundation than in upper walls. The adobe mortar is hard in several instances, more durable than the rocks themselves, many of which crumbled into sand as the accumulations of débris about them were removed. Many walls were plastered inside, others on their exterior surfaces; others were laid dry and afterwards pointed. The mortar in joints between stones in places was chinked with stones which appear on the outside in ornamental lines. Many prints of human fingers show that the plastering was put on with the hand, not with trowels.

Apparently the ancient builders found the construction of round rooms as easy as that of angular chambers, and cut stones in curved as readily as in plane surfaces. There were places where poorly-laid masonry evidently had been repaired by the ancients, as shown by the difference in color of the adobe mortar used. A number of rejected slabs which the builders had failed to cut where they wished showed their method of dressing building stones. A groove was pecked along the surface where fracture was desired and the fragments were afterwards broken off with stone hammers. Water was used to soften the stone. Battered edges of stone are common and projections from the walls not rare. Stones of different degrees of hardness were laid with one another. The largest stones observed in the walls could be readily handled by two persons without mechanical contrivances.[a]

The stones used for thresholds, lintels, and jambs were smoothed by rubbing as well as hewn into shape. No indication was found that the Cliff Palace masons knew anything of the arch or the keystone. They did not use the supporting pillar or column, as at Spruce Tree House.

DOORS AND WINDOWS.

Two types of doorways, lateral and vertical, are represented in Cliff Palace. In the upper stories the T-shaped and the rectangular doorways are about equal in number, both occurring in such positions that it is not possible to say how they were entered from the ground or from the terrace far below them. Rarely does the threshold lie on

[a] Stones were transported from quarries a short distance from the ruin.

a level with the floor, and commonly there is a projecting stone in the wall below it to facilitate entrance. Although doorways are mostly low and narrow, some are wide enough to admit two persons side by side.

In most instances both lintels and thresholds are made of dressed stone, and the latter in places project slightly beyond the wall. The door is a rectangular stone held in place by upright sticks and clay.

Small peepholes admit light or in some cases these served as outlooks from which to observe passers-by. One of the most interesting of these is situated in such a position that one can see everyone entering the street from the main plaza.

FLOORS AND ROOFS.

No roof in Cliff Palace was found intact, the beams of all having been torn from the walls, but the line of holes in the latter, indicating their former presence, show the method of insertion of rafters.

Most of the floors had been broken into for skeletons or other buried objects. Those of certain kivas are hard, evidently having been laboriously leveled by the builders with stone implements. As a rule, however, the floors were hardened adobe tramped or beaten down, in some cases laid on sticks.

FIREPLACES.

Fireplaces are common in all plazas, generally in angles of rooms, and indeed wherever opportunity offered. Most of them are rimmed with clay borders or with stone slabs set upright. Ashes are found in the majority of them and the adjacent walls are blackened by smoke.

COLLECTIONS.

Notwithstanding the fact that Cliff Palace had probably been dug over more than any other cliff dwelling on the Mesa Verde, a fairly good representative collection was obtained, which will be described in a report to the Secretary of the Smithsonian Institution. The unique specimens were deposited in the National Museum, but many duplicates, especially of large objects, were left *in situ*. Fragments and whole pieces of pottery secured show that there was not a great variety of form or color in the ceramic ware of Cliff Palace. The best specimens are coiled or indented ware. The smooth forms for the most part are white with black decoration or red with black lines. The ornamentation of the former consists of scrolls, crosses, or bird tracks, always in relief, that of the latter mainly geometrical figures.

A considerable number of stone axes, single or double edged, pitted mauls, hammers, and grinding stones were excavated. One of the axes still has its wooden handle attached. Bent or broken sticks and detached handles were not rare in refuse heaps.

Woven fabrics, as basketry, belts, cloth, and cords are numerous. A few sandals and fragments of a moccasin show the character of footwear used by the ancient inhabitants. Not the least important specimens are bone awls of different shapes, needles, skin scrapers, and tubes tied together, evidently ornamental in character.

The indications from the human bones collected are that the inhabitants of Cliff Palace were of small stature. They were peaceable, timid agriculturalists who passed their lives in the cultivation of small farms on the mesa top, which can still be traced by the clearings. Their scanty clothing consisted mainly of woven kilts made of yucca fiber and cotton, or coarse fabrics in which were woven feathers or strips of rabbit skin.

The work was apparently apportioned among the men and the women as among the Hopi. The men made kilts, blankets, and sashes and performed an almost endless round of rites and ceremonies. They were masons and in a measure hunters. The women owned the secular houses and were potters; they ground the corn and prepared the food. They assisted in building the houses and were the plasterers. They were also the burden bearers, bringing water from the water holes. All wore ornaments, some of polished lignite, bone, or rarely turquoise. The warriors had bows and arrows, stone hatchets, mauls, and other weapons. The ancient inhabitants were ignorant of metal implements and of seashells. They had no domesticated animals except possibly the dog and the turkey or the eagle, the feathers of which birds were used for ceremonial purposes.

CONCLUSIONS.

The indications are that Cliff Palace, like other cliff dwellings of considerable size, was not constructed all at once or in one generation. It may be assumed that originally one or more clans settled in the Cliff Palace cave, and that subsequently other families or clans joined them, accepting building sites allotted by mutual agreement. The growth in population resulting from outside accessions and from natural increase within necessitated the building of new rooms to accommodate them. By intermarriage this population tended to homogeneity and buildings once separated were united. It follows that the present plan of Cliff Palace was not thought out in the beginning but is the result of a haphazard growth of clans more or less independent.

The desertion of Cliff Palace possibly followed the same course as its growth, as one clan after another sought new homes or more congenial neighbors. Finally the last remaining inhabitants abandoned Cliff Palace, or perhaps died out in their pueblo, and the place was deserted. The causes of the abandonment are conjectural, possibly more trivial than we may suspect. Failure of the water supply or of crops, the presence of contagious diseases, or internal dissensions ultimately may have led to the desertion of the place. It is possible also that hostiles raided the cornfields at harvest time and forced the inhabitants to seek other homes. Quarrels about water, desire for union with clans of neighboring or distant villages, fear that the gods were displeased, rivalry of clans, petty altercations due to gossip—one or all of these considerations, according to Hopi legends, may have culminated in the abandonment by the natives of pueblos in which their ancestors formerly lived.

The aimless desire for new habitations, the drifting of clans to new and, in their eyes, better localities, was a cause that likewise must be considered. It must be borne in mind that there was little cohe-

sion among the cliff-house clans. There were continual bickering and many altercations in which the inhabitants took one side or another, which ultimately led to the abandonment of the place.[a]

My investigations at Cliff Palace add little to our knowledge concerning the century in which the earliest clan began its construction or the date when this ancient cliff dwelling was deserted. Possibly it was inhabited five hundred years ago, but there is no proof that it was not populous at an earlier or a later date. There is some ground for the belief that the site was occupied before that of its nearest large neighbors, Spruce Tree House and Balcony House, and it is probable that the first houses were built in what has been designated the "Old Quarter."

The most ancient arrivals apparently lived after much the same manner as the more modern. Cliff-house culture was not evolved in this canyon, although here the building instinct reached its maximum development. Every addition to our knowledge favors the supposition that this culture has been practically perpetuated, with many modifications, to the present day in that of modern pueblos, but this statement does not mean, of course, that new blood has not been introduced and some cultural differences have not been lost. The people of Cliff Palace were undoubtedly better masons than the cliff dwellers of northern Arizona or of any of the modern Hopi pueblos, as Walpi or Oraibi, but they were not as good potters as the Sikyatki women, the direct ancestors of some of the Hopi clans. Apparently people of the same culture as that of Cliff Palace inhabited the pueblo now in ruins on the point west of the ruin and others scattered over the mesa. The ruins of these pueblos can hardly be distinguished from ruins of ancient Hopi villages. Discussion of this and other questions of speculative interest finds a natural place in my report to the secretary of the Smithsonian Institution.

In conclusion, permit me to express my appreciation of your action in giving me the opportunity to work out the problem of the excavation and preservation of Cliff Palace. It is believed that this great structure is now accessible to those who would study one of the greatest known examples within our borders of the work of the American aborigines.

I have the honor to be, very respectfully, yours,

J. Walter Fewkes,
Ethnologist, Bureau of American Ethnology,
Smithsonian Institution.

The Secretary of the Interior.

[a] A sociological study of the causes of the dismemberment of the Hopi pueblo, Oraibi, might shed much light on the desertion of ancient habitations where the ancestors of allied people once lived.

REPORT ON WIND CAVE, CRATER LAKE, PLATT, AND SULLYS HILL NATIONAL PARKS, AND CASA GRANDE RUIN.

REPORT ON WIND CAVE, CRATER LAKE, PLATT, AND SULLYS HILL NATIONAL PARKS, AND CASA GRANDE RUIN.

WIND CAVE NATIONAL PARK.

By the act of Congress approved January 9, 1903 (32 Stat., 765), a tract of land containing 10,522 acres in the State of South Dakota, 12 miles east of the town of Hot Springs and the same distance southeast of Custer, was reserved and withdrawn from settlement, entry, sale, and other disposition, and set apart as a public park, to be known as the "Wind Cave National Park."

The park is placed under the exclusive control of the Secretary of the Interior, who, among other things, is authorized to prescribe rules and regulations and establish such service as may be deemed necessary in its management and protection, and, in his discretion, to rent or lease the cave from which the park takes its name, and also parcels of land for the erection of buildings for the accommodation of visitors. The fund arising from such rentals is covered into the Treasury and made available for expenditure in the care and improvement of the park.

At the time of the creation of the park there were 10 entries covering lands therein, aggregating 1,519.15 acres, 5 of which, covering 799.76 acres, have since been canceled, and the remaining 5 entries have been found proper in all respects and patents issued therefor, as follows:

NE. ¼ NW. ¼ and NW. ¼ NE. ¼, sec. 35, T. 5 S., R. 5 E., Black Hills meridian; Jonathan C. West; F. C. 3003, patented December 31, 1904; 80 acres.

SE. ¼ NE. ¼ and lots 1 and 2, sec. 2, T. 6 S., R. 5 E.; George A. Stabler; F. C. 2666; patented September 11, 1905; 159.39 acres.

SE. ¼, sec. 2, same township and range; Susanna D. McDonald; C. E. 3770; patented December 10, 1895; 160 acres.

NE. ¼, sec. 11, same township and range; Kate M. Stabler; F. C. 2600; patented September 26, 1902; 160 acres.

NW. ¼, sec. 12, same township and range; Margarethe Drenkhahn; F. C. 2434; patented May 8, 1901; 160 acres.

This gives a total of 719.39 acres of patented lands remaining in the park, which, for administrative purposes, should be eliminated through appropriation by Congress for their purchase.

Mr. Seth Bullock, now marshal for the district of South Dakota, has, with the consent of the Attorney-General, been continued in general charge of the reservation, in an advisory capacity, and the superintendent, Mr. J. E. Pilcher, who succeeded Mr. William A. Rankin on May 1, 1909, confers with him in regard to its administration. This course has aided in the effective management during the past season.

A revocable privilege has been granted to the wife of the superintendent, in the absence of other accommodations in the park, to furnish meals to tourists at 50 cents each, which service has proved satisfactory in the past. The old building, constructed in 1893, in which meals are served, has been repaired and greatly improved in appearance. The number of tourists to the park during the year was 3,216.

During the season six permits were granted for the transportation of passengers in and through the reservation at the rate of $50 per vehicle, such fee being charged in the case of liverymen, outfitters, and others operating for profit. One of these was for automobile transportation.

No applications were received for the driving of cattle or other stock through the park.

Regulations corresponding to those heretofore issued for the other national parks, providing for the impounding of trespassing cattle in the Wind Cave National Park, were promulgated in 1908, but settlers and stock owners in the vicinity protested against the enforcement of such regulations, claiming that they had always used the park lands as a free range, and, in the absence of fencing, it would be very difficult to keep their stock outside of the boundaries. In view of such representations the impounding regulations were suspended indefinitely. As a protective measure against trespassing stock an early appropriation is recommended for the construction of a fence entirely around the park.

There have been no forest fires in or near the park during the year.

Some wild animals abound, especially the coyote and prairie wolf; others are the black and white tail deer, badger, porcupine, skunk, and red squirrel. There are also some game birds, such as grouse, quail, and wild duck, in the park, as well as the eagle, hawk, thrush, woodpecker, and magpie.

The superintendent reports that the spring rains damaged the roads in the southern part of the reservation, and considerable repair work has been necessary. One abutment of the first bridge south of the cave was washed out, requiring the construction of a temporary road around the same during repairs. He recommends stone abutments for the three bridges immediately south of the cave, as the gypsum soil, when wet or under heavy pressure, is difficult to hold in place, and the bridges require constant surveillance; good building stone can be obtained within 1 mile. Roads and bridges are now in fair condition, although requiring daily work on account of continuous rains.

The cave house has been remodeled, inside conveniences afforded tourists, and the stairway leading thereto replaced by a new one. It is reported that the wooden stairways in several chambers of the cave rot in a year or two and become unsafe, and that some of these now need replacing. The superintendent recommends the opening up of new chambers or territory during the winter, as no exploration work can be conducted during the tourist season.

The office building has been equipped with eave troughs, and tile piping laid to drain water from the building. A stone wall of rough ashlers is necessary along the front of the office and residence to protect the grounds from constant washing during the rainy season. The rock therefor can be obtained near by.

The superintendent recommends the construction of a rough lumber stable for the accommodation of the teams of tourists, to replace the old shed now used, which is not worth repairing. New gates for the north and south entrances have been ordered.

The buildings in the reservation now consist of the following: Superintendent's office, in good condition; cave house, in good condition; restaurant building, passable with recent repairs; and blacksmith shop, constructed of rough lumber and whitewashed during the past season.

Native trees have been transplanted to the grounds surrounding the superintendent's office and are doing well. Water has been piped to convenient points for watering the same.

An estimate for an appropriation of $2,500 for the protection and improvement of the park has been submitted to Congress.

CRATER LAKE NATIONAL PARK.

By the act of Congress approved May 22, 1902 (32 Stat., 202), the tract of land bounded on the north by the parallel 43° 4′ north latitude, south by 42° 48′ north latitude, east by the meridian 122° west longitude, and west by the meridian 122° 16′ west longitude, having an area of 249 square miles, or 159,360 acres, in the State of Oregon, and including Crater Lake, was reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart forever as a public park or pleasure ground for the benefit of the people, to be known as "Crater Lake National Park."

The act setting aside these lands for park purposes differed from legislation creating other national parks in that it provided, among other things, that the reservation should be open "to the location of mining claims and the working of the same." It was not believed, however, to be the purpose of this provision to extend the mining laws to the reservation without limitation, but only to authorize the location and working of mining claims therein in such manner as not to interfere with or prejudicially affect the general purpose for which the reservation was established. The regulations for the government of the park, which were reissued June 10, 1908, clearly define the conditions under which this privilege is to be exercised.

The Geological Survey has, at the request of the department, undertaken a topographic survey of this reservation, and the remonumenting of certain portions of the boundary, with a view to securing an authentic administrative map. The field work on this map is now practically completed.

In the fall of 1908 little improvement work could be attended to, owing to continual snows and heavy rains during October. Considerable repair work was necessary in November, which was also noted for heavy storms.

Late in the fall of 1908 the boat on Crater Lake and all tools and implements were properly housed, the flooring was removed from bridges and stacked up on the ground, and the fences, gates, and bridges braced to withstand the weight of the snows, which were unprecedentedly heavy during the past winter. On November 23 the superintendent, Mr. W. F. Arant, and his family left the reservation and took up winter quarters at Klamath Falls, Oreg., all tourist travel being impossible after that date.

In April of the present year the superintendent returned to the park headquarters through 12 feet of snow and discovered that considerable damage had been done to the house, barn, and some other buildings. During the months of May and June he made temporary headquarters at Fort Klamath, 17 miles from the park headquarters, in order to better care for the injured buildings.

After July 1 road, trail, and other improvements were started. By the use of heavier and stronger timbers, steeper roofs, and improved workmanship during the year it is believed that the collapsing of the roofs in winter may be avoided. At the date of this report, after expending about $700 upon buildings, $300 upon roads, trails, bridges, and fences, and $100 for tools and implements, all improvements were in as good shape as the limited appropriation would permit.

The superintendent has heretofore recommended that the trail to Sand Creek and Mount Scott be converted into a good wagon road, in order to make these scenic points more accessible; also that new trails be constructed along the rim of the crater to Watchman and Glacier peaks, and from the present wagon road to the crater, thence to Crater Peak and down along Sun Creek.

At the time of the creation of the park there were 15 land entries, 12 of which, totaling 1,914.22 acres, have been patented. Unperfected homestead entries Nos. 2415, 2620, and 2660, aggregating 481.11 acres, were canceled in 1908 and 1909. The patented-land acreage includes a considerable portion of original timber land entries Nos. 2116 and 2120 (patented to Daniel M. and Arthur C. Griffith, respectively), which extend beyond the park boundary line.

The title of the State of Oregon to school sections 16 and 36 within the park boundaries had been extinguished before the creation of the reservation, by selection of other land in lieu thereof, except a tract containing 192.20 acres in the N. ½ of sec. 16, T. 32 S., R. 7½ E., which has since been disposed of by the State to private parties.

The department recommends the condemnation and purchase of all private claims with a view to better administration. The superintendent believes that in the near future summer-resort homes may be established upon such lands, which will increase the difficulties of administration and also add to the aggregate sum which the Government will eventually have to pay the owners.

The condition of animals and birds in the park is much the same as reported last year. Only those species are found which were common to the reservation before its creation. Deer, bear, and other game appear to be on the increase, and some have become quite tame. Panthers, mountain lions, lynxes, and coyotes are few, and none of the smaller game has been killed or injured by such predatory animals. Squirrels, chipmunks, and ground hogs are quite numerous, and in the higher mountains some fishers, pine martins, and other small fur-bearing animals can be found.

The increase in grouse and timber pheasants is gratifying. A number of other birds, such as the blue jay, black-headed jay, camp robber or Rocky Mountain jay, the oriole, and the snowbird, also make the park their summer home. Some broods of young ducks have been seen on Crater Lake, but Wizard Island, where they gather, is not regarded as a favorite nesting ground. Flocks of wild geese have

also been seen resting from their migratory flight, but the lake elevation is too high and cold to be the natural habitat of wild waterfowl.

During the winter season nearly all animals drift to lower grounds outside of the park boundary. The superintendent recommends the extension of the park, to include a lower section of the country on the slope of the Cascade Mountains, to afford additional protection to this game.

Fishing has been permitted in Crater Lake from July 1 to September 30 with hook and line, each person being limited to five per day. The only species in such lake are the rainbow and lake trout. There were no fish in the lake naturally, but it is believed that the liberation of a large number of the young of the rainbow trout would greatly improve this body of water. Food fish from near by could be secured to keep up the quality and number of such fish. The Dolly Varden trout and the lake trout from Klamath Lake are found in Anna Creek. All waters would be improved by stocking with good varieties of trout.

Only one small forest fire was discovered in the vicinity of Crater Peak; by prompt attention and the assistance of a heavy rain this was extinguished before any damage was done.

Camp Arant, maintained by the Crater Lake Company under contract with this department, was opened July 5 for the accommodation of tourists. Camp Crater, 5 miles from the former and upon the rim of the crater, was established July 20. Five hundred and forty-four persons were accommodated at these camps, and a large proportion thereof took the boat trip upon the lake, this and other transportation service being permitted under the Crater Lake Company's contract.

The registration book shows a total of 4,171 persons visiting the reservation. Making allowance for those unable to register, it is estimated that the total was probably 5,000. Few persons camped in the park more than one night.

The superintendent submits an estimate of the appropriation required for the next fiscal year, as follows: Salaries, $2,865; construction and repair of roads, trails, and bridges, $29,200; repairs and improvements to buildings and fences, electric lighting plant, tools and implements, and emergency expenses, $3,275; total, $35,340.

PLATT NATIONAL PARK.

By the acts of Congress of July 1, 1902 (32 Stat., 641), and April 21, 1904 (33 Stat., 220), 629.33 and 218.89 acres, respectively, at the town of Sulphur, Okla. (then Indian Territory), were segregated as the "Sulphur Springs Reservation," which designation, by joint resolution approved June 29, 1906, was changed to "Platt National Park."

The park, with a total area of 848.22 acres, extends in irregular form a distance of approximately 3 miles from northeast to southwest along Travertine Creek, including a portion of Rock Creek, which empties into the former, and it has a circuit of 9 miles.

Within the park are 33 known mineral and 2 nonmineral springs. The principal groups are the Bromide and Bromide-Sulphur springs in the southwestern part of the park, Beach and Pavilion springs in

the northwestern corner, and the Wilson group in the southern part. Sulphur springs predominate, but there are also bromide, soda, and iron varieties. The Antelope and Buffalo springs, nonmineral in character, are situated at the extreme northeastern end of the Platt National Park, with an elevation of 1,083 feet above sea level and an approximate discharge of 5,000,000 gallons daily into Travertine Creek.

The following is a statement of the mineral springs which have been to some extent developed and improved, together with the estimated daily flow in each case:

	Gallons.
Bromide Springs (3)	275
Bromide-Sulphur	250
Taff or Black Sulphur	500
Hillside	129,600
Pavilion Springs (7)	200,600
Beach Springs (3)	125,000
Wilson	1,000
Jericho	200

A watchman oversees the distribution of water at Bromide Springs.

The pavilion over Hillside Spring was very badly damaged by severe windstorms during the past year, and is now in a dilapidated and dangerous condition. The superintendent, Mr. A. R. Greene, suggests the construction of a new pavilion at this point commensurate with the importance of the spring, with a semicircular inclosure of concrete for protection from the hillside drainage, a flooring of concrete, and a bowl or reservoir in the center of the pavilion, together with concrete seats, the estimated cost being $2,500.

Approximately 2,500 head of cattle and horses have been driven across the park during the year. But little, if any, of this stock was shipped from Sulphur, it being in transit from the winter range in the brakes of the Washita to the summer range on the prairie north of the town.

The park was fenced during the year, at a total cost of $1,855. Nearly 9 miles of fencing was required for the boundaries of the park and 3 miles for the lanes constructed for the benefit of the public. The principal lane, which has been named "Buckhorn," leads from Second street on the north, by the most practicable route, to the southeastern corner of the park, and is a thoroughfare between Scullin and Sulphur, also accommodating a large farming community along Buckhorn and Oil creeks. Branching off from this is a lane to Bromide Springs, affording a short and pleasant route for citizens on the north; this has been named "Bromide." The Sulphur-Bromide lane starts from the same point on Buckhorn lane, running to Sulphur-Bromide Springs, and accommodates a farming community along lower Rock Creek. Another short lane, the "Lockwood," affords entrance to the park from the southeast; this connects with the Brookside trail, which runs the whole length of Travertine Creek.

The Cliffside foot trail, constructed this year, runs westerly from Sulphur-Bromide Springs and meanders down the face of the cliff to Bromide Springs. It is three-quarters of a mile in length, is much frequented, and makes accessible some very beautiful scenery. The main entrance to the reservation at Second street on the north has been graded and improved, and this is the greatest thoroughfare

for persons on foot approaching West Central Park and the Pavilion Springs. The Riverside trail, extending from near Pavilion Springs to a junction with Cliffside trail, affords another short route from the north. The condition of all roads and trails is fairly good. After July 1, 1909, only small outlays from the monthly contingent fund can be used for supervision and repairs, owing to the limited amount available, and little can be done should the park be visited by torrential rains, such as were experienced last season.

The rock arch footbridge, constructed across Travertine Creek during the year, at a total cost of $3,985, was completed and dedicated as "Lincoln Bridge" on February 12, 1909, with appropriate exercises; it is universally admired for its beauty and durability. Ornamental shrubs and flowers have been planted at each end.

A massive steel bridge was completed across Rock Creek at Davis avenue on June 16, 1909, at a total cost of $7,380, and dedicated upon the day of opening as the "Washington Bridge." This bridge has a roadway of reinforced concrete, with a pavement of creosoted wooden blocks on top. Six foot sidewalks are made of reinforced concrete without the blocks. The superintendent considers this the most useful improvement that could have been made in the park; it affords a highway for heavy teams between two railroad stations, and is of special benefit to the city of Sulphur rather than the park.

Other small wagon or foot bridges were constructed during the year. One, built across a rocky gulch in East Central Park, was made necessary to replace a bridge theretofore constructed across Sulphur Run, which was abandoned with a view to the realignment of the wagon road crossing the park at its widest point. A new culvert was built along the new road to accommodate the surface water of Sulphur Run ravine below Pavilion Springs.

The Bromide Springs wire suspension bridge, completed June 20, 1908, has been used by about 136,590 persons visiting the Bromide Springs during the first year of its existence, and it was so well built that no repairs or outlay of any kind have been necessary.

The salaries of the park force during the fiscal year aggregated $5,545.50. Improvements (other than the two large bridges and fencing, for which amounts have been given), as well as electric light, telephone, and other services, and contingencies, aggregated $3,440.72. The grand total of expenditures was $22,206.22, leaving on July 1, 1909, an available balance of $5,843.14, which, with the small revenue now accruing from transportation and other licenses ($114 so far this year), will not be sufficient to do any more than carry the present force of employees, provide electric light and telephone service, and a small contingent fund.

Thirteen transportation and two photographic permits have been issued since July 1, 1909. It is almost impossible to secure any proposals for establishing refreshment stand, boating, or other services in the park, although its location adjoining the town of Sulphur is in its favor. Formerly the mineral waters were shipped from Sulphur in considerable quantities, the Bromide Springs waters being particularly noted for their medicinal qualities, but no applications for a license of this character have been received in the past few years.

As a result of a topographic survey undertaken by the Geological Survey in 1908, a map of the park showing drainage, location of

the springs, etc., has now been issued, and is of great advantage in administrative work.

In 1907 the city of Sulphur was granted temporary permission to take water from Travertine Creek, just below what is known as "Little Niagara," for domestic water supply and fire protection, to the extent of 100,000 gallons daily. The provision was made that the city should construct a 500,000-gallon storage reservoir outside the park limits, but this requirement has not yet been complied with. It is stated that the city is in financial straits, can not get the money to make such improvements, and will endeavor to have Congress authorize the use of this water permanently and with less restrictions.

In 1907 and 1908 estimates were submitted to Congress for the construction of a sanitary sewer system, with laterals to intersect others connecting with the city's system, to convey from the park lands the drainage and sewage which, owing to the topographic conditions, now run into and contaminate the creeks and springs of the reservation. The engineer's estimate of the cost of a system with an outlet beyond Bromide Springs, just outside of the boundary, was $27,962; this, the superintendent thinks, would probably be increased to $35,000 before completion of the work. He now submits a plan which he believes would provide an equally serviceable sewer—the construction of a dam across Rock Creek and the valley at a point considerably above Bromide Springs with the triple purpose of disposing of the sewage, establishing an electric-light plant for the park, and providing an expanse of water upon which sail, power, and row boats could be operated. This will result in submerging Coney Island and will form a lake with the surface about 940 feet above sea level. This plan would obviate the necessity for extending the sewer any farther than the lower end of Coney Island, on the eastern side of the submerged area, the whole project being estimated to cost $18,650. The merits of this plan have not been investigated by the department.

Last year Congress made an appropriation for the present fiscal year ($15,000 of which was to be expended for the sewer system, provided the city expended an equal sum), payable from the revenues. As the balance of the revenue fund is barely sufficient to cover salaries, however, no such improvement can be undertaken, and furthermore, it is understood that the city is not in a financial condition to do its part. On account of the lack of sewerage facilities and the long drought during the past summer, the park has become quite filthy in certain parts, and the residents of the locality have presented petitions urging immediate appropriation by Congress to improve the sanitary conditions, which threaten the health of the community. If an appropriation is made for the park in the sum of $25,000, the estimate submitted to Congress, it will be possible to begin sewer construction next year and carry on the entire project to completion as future appropriations are available.

Most gratifying results have been obtained by sodding portions of the park with Bermuda grass, and the cultivation of oats, alfalfa, corn, etc., for the park stock. This also prevents these tracts from growing up in rank weeds, which mar the landscape and produce disease.

The superintendent recommends that the present restrictions imposed upon stock owners through the construction of the fence to keep out their stock be adhered to by allowing the fences and lanes

to remain as at present, where they were placed after careful consideration. He reports that a residence and administration building will be required in the near future, and should be located upon a commanding knoll southwest of the present office, where it will afford a view of the whole park and of the city of Sulphur. The further recommendation is made that an electric-light plant be established.

The park has recognized advantages for the holding of general conventions, and accommodating religious, educational, fraternal, and other gatherings. Approximately 25,000 persons visited the park during the year, 1,000 coming by wagon and camping for three days or more. The Bromide Springs register shows an attendance during the fiscal year of 106,332. Many of these were citizens of Sulphur, visiting the springs each day, who were counted at each visit. The Pavilion Springs probably had a still greater local attendance.

SULLYS HILL PARK.

This reservation, set aside by executive proclamation dated June 2, 1904, under the act approved April 27, 1904 (33 Stat., 319), contains about 780 acres. It is located on the south shore of Devils Lake, North Dakota, having about 2 miles of shore line, with its western boundary 1 mile east of the Fort Totten Indian School. Inasmuch as no appropriation has been made for the care and protection of this reservation, Mr. Charles M. Ziebach, in charge of the Indian Industrial School, Fort Totten, has been continued as acting superintendent, and required to exercise the necessary supervision and control over the same until appropriation is made therefor by Congress.

The tract is well wooded and has an ample supply of water and many rugged hills, among which, on the western boundary, lies what is known as "Sullys Hill." In the southwestern part is a small body of water known as "Sweet Water Lake," west of which the surface is generally level and the soil good.

Approximately 40 persons camped in the park for three days or more during the past summer, and 150 spent one day in sight-seeing.

The steamboat landing is at least 2 miles from the park, and the acting superintendent recommends the building of a dock to allow boats to land within the park limits, to make it more accessible for visitors. Until this is done, as well as repair work upon the roads, construction of new ones, the walling up of springs, etc., the reservation is not likely to be patronized to any extent. There are no buildings or improvements of any kind in the park.

The acting superintendent renews his previous estimates for an appropriation of $3,000 for the fiscal year 1911.

CASA GRANDE RUIN.

This reservation is located near Florence, Ariz., about 18 miles northeast of Casa Grande station, on the Southern Pacific Railroad, and contains about 480 acres. It was set aside by executive order dated June 22, 1892, under the act approved March 2, 1889 (25 Stat., 961).

Casa Grande is an Indian ruin of undetermined antiquity, which was discovered in 1694 by Padre Kino, a Jesuit missionary. This

great house is said to be the most important ruin of its type in the Southwest, and as such it has strong claims for archæological study, repair, and permanent preservation. It is built of puddled clay, molded into walls and dried in the sun, and is of perishable character. The main building was originally five or six stories high and covered a space 59 feet by 43 feet 3 inches. The walls have been gradually disintegrating, owing to the action of the elements. A corrugated iron roof has heretofore been erected over this building to protect it, so far as practicable, from further decay.

Surrounding Casa Grande proper is a rectangular walled inclosure or "compound," having an area of about 2 acres. In this inclosure, which has been called "Compound A," there have recently been excavated a number of buildings or clusters of rooms, and others are known to exist which have not yet been excavated. Two other compounds have been discovered and designated, respectively, "Compound B" and "Compound C." The former has been the scene of operations during the past year, but the latter has not yet been excavated and is still in the form of a mound. The three compounds together constitute what is known as the "Casa Grande" group of ruins.

The custodian, Mr. Frank Pinkley, who resides on the reservation, reports that the ground plan of the ruins was increased by some 57 or 58 rooms, a number of large plazas, and surrounding walls, making the total number of rooms now open on the ground floor over 100, and as a result of work done by Doctor Fewkes, of the Bureau of Ethnology, the points of interest to visitors have been materially increased.

No money, other than the custodian's regular salary, was expended this year.

Mr. Pinkley recommends that an appropriation of $3,000 be secured for the erection of a museum building near the ruins to shelter the results of future excavations, and to place the household utensils, war and agricultural instruments, and other objects belonging to the prehistoric people in proper relation to the architecture and environment, to facilitate the study, from a scientist's point of view, of any one phase of the aboriginal life. He also recommends an appropriation of $2,000 for further excavation and development work.

It is reported that there is need for literature for distribution to visitors, and that probably 2,000 fifty-page pamphlets could be easily disposed of the first year, and greatly increase interest in the reservation.

There are to the east of the Casa Grande Ruin two other groups of ruins, which the custodian reports are on land thrown open to settlement, and one of which is endangered by the proposed construction of a railroad, and he suggests that such ruins be added by Congress to the reservation now existing.

REPORT ON HOT SPRINGS RESERVATION, ARKANSAS.

REPORT ON THE HOT SPRINGS RESERVATION, HOT SPRINGS, ARK.

On May 19, 1909, the resignation of Mr. W. Scott Smith, superintendent of the Hot Springs Reservation, was accepted, and Mr. H. H. Myers was appointed and entered upon duty July 1. As Mr. Smith rendered no formal report to the department covering the affairs of the reservation during the fiscal year ended June 30, 1909, the following report has been prepared from data in the office of the secretary, a few of the tabular statements having been furnished by Mr. Myers upon request:

Arkansas was organized as a Territory March 2, 1819, and by act of April 30, 1832 (4 Stat., 505), the hot springs in such Territory, together with four sections of land including such springs, were set aside and reserved for the future disposal of the United States; this tract contained 2,529.10 acres. Title to the hot springs was originally acquired through the Louisiana purchase of April 30, 1803, which was strengthened by the treaty made with the Quapaw Indians August 24, 1818, which ceded to the United States all lands south of the Arkansas River.

The act of Congress approved March 3, 1877 (19 Stat., 376), authorized the appointment of commissioners to lay out into squares, blocks, lots, avenues, and streets certain tracts of land in Garland County, Ark., known as the "Hot Springs Reservation," the appointment of a superintendent by the Secretary of the Interior and the levying of a tax upon water taken from the springs, the funds derived therefrom to be used in the improvement of the reservation. Two thousand one hundred and thirty-five lots were platted by the Hot Springs Commission in 1878, or subsequently, all of which have been disposed of in the manner provided by law, with the exception of 169. An appraisement of these lots in 1904 gave a value of $88,125. The tracts known as "North Mountain" (224.74 acres), "West Mountain" (281.94 acres), "Sugarloaf Mountain" (129.02 acres), "Hot Springs Mountain" (264.93 acres), and "Whittington Lake Reserve" (11 acres), with a total area, in all, of 911.63 acres, were, by the act of Congress approved June 16, 1880 (21 Stat., 288), forever reserved from sale and dedicated to public use as parks, to be known as the "permanent reservation." The mountain roads constructed by the Government afford a continuous drive of about 9 miles, the grades ranging from 6 to 7 per cent.

The total number of hot springs on Hot Springs Mountain is 49, with an approximate flow of 1,000,000 gallons daily, the range of

temperature being from 97.2° to 147° F. The springs are walled up with brick, with arches sprung over the top and manhole entrances to permit of examination and repairs to pipe connections.

A chemical analysis of these waters was completed in December, 1901, at the request of the department, by Prof. J. K. Haywood, of the Bureau of Chemistry, Department of Agriculture, and his report constitutes a valuable contribution to our knowledge of thermal waters. The theory advanced by Walter Harvey Weed, lately a geologist of the Geological Survey,[a] which is now generally accepted as to the source of the heat, is that the heat comes from a great body of still-heated igneous rocks intruded in the earth's crust by volcanic agencies underlying a large part of central Arkansas. Deep-seated waters converted into vapors by contact with this "batholith" of hot rock probably ascend through fissures toward the surface, where they meet cold spring waters which are heated by the vapors, or these vapors are condensed and flow to the surface as hot water. No hypothesis has yet been advanced which satisfactorily accounts for the remarkable cures that have been made.

Dr. Bertram B. Boltwood, of New Haven, Conn., was designated in 1904 by the department to examine into the radio-activity of the waters of the hot springs. His report indicated that they are radio-active to a marked degree, such radio-activity being due to dissolved radium emanation (a gas) and not to the presence of salts of radium or other radio-active solids.

The principal diseases benefited or cured by the use of the waters (either externally or internally) are rheumatism in various forms; blood disorders of a chronic nature; gout, stiff joints, sciatica; paralysis; spinal diseases; female diseases, especially sterility and leucorrhea; malaria; alcoholism; excesses from tobacco habit; and nervous affections.

By act of Congress approved October 2, 1888 (25 Stat., 527), $31,000 was appropriated for a system of reservoirs, pumps, piping, and for other purposes necessary to the collection and economical distribution of hot water on the Hot Springs Reservation. Pursuant to this authority a plan for the collection, impounding, and pumping of the hot waters was adopted and contracts for the work let. Prior, however, to the completion of the work upon the system in June, 1891, Congress passed a law on March 3, 1891 (26 Stat., 844), the sixth section of which provided:

> That the authority heretofore conferred upon the Secretary of the Interior to collect the hot water upon said reservation shall be so construed as to require water to be collected only where such collection is necessary for its proper distribution, and not where by gravity the same can be properly utilized.

The effect of this law has been to render the use of the pumping plant unnecessary, and the pump has not been in operation since its installation. Directions were accordingly given to remove these pumping engines from the pit in the pumping station building and properly store them in another part thereof; also to fit up this building in a suitable manner for office purposes. Since 1898 such building has been used as the office of the superintendent of the reservation.

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[a] The Hot Springs of Arkansas, S. Doc. 282, 57th Cong., 1st sess., p. 94.

All bath houses on the reservation are supplied by gravity, and those off the reservation that are not supplied by gravity are required to pump the hot water from the impounding reservoir at their own expense.

One of the principal improvements in 1900 was the construction of an additional impounding reservoir, situated in the rear of the "Big Iron" bath-house site on the reservation; this valuable and capacious reservoir was immediately put into use by gathering and storing all the water that formerly ran to waste. The overflow is connected with the supply mains of the large impounding or main reservoir. This reservoir has a capacity of 26,109 gallons and was constructed at a cost of $1,500.

The receipts and disbursements relating to the Hot Springs Reservation for the year ended June 30, 1909, were as follows:[a]

Receipts and disbursements, Hot Springs Reservation.

RECEIPTS.

Balance, Hot Springs fund, July 1, 1908		$14,502.31
Receipts for fiscal year:		
Water rents	$29,375.00	
Ground rents	5,100.00	
Total receipts		34,475.00
Grand total		48,977.31

DISBURSEMENTS.

Disbursements:		
Salaries for fiscal year	$14,881.00	
Repairs, improvements, incidentals, and miscellaneous supplies	3,761.55	
Expended by special disbursing agent		$18,642.55
Expended by the department		808.34
Paid on auditor's certificate by the Treasury		309.13
Total disbursements		19,760.02
Balances, June 30, 1909:		
In Treasury	$28,739.53	
In hands of chief disbursing clerk of department	169.14	
In hands of superintendent and special disbursing agent	308.62	
Available balance, Hot Springs fund, July 1, 1909		29,217.29
Grand total		48,977.31

[a] A pamphlet entitled "Laws and Regulations relating to the Hot Springs Reservation," compiled in the department, gives a statement of all appropriations and revenues of this reservation from March 3, 1877, to December 31, 1907.

There are 20 employees besides the superintendent required to properly maintain and care for the reservation interests. Their names, duties, and compensation are shown in the following table:

Personnel of the reservation force, with the compensation and duties.

Name, occupation, and duties.	Salary per year.
Harry H. Myers, superintendent	$3,000
B. Frank Bayley, clerk and assistant to the superintendent	1,500
ames Daniels, laborer at superintendent's office	540
Duties are to act as messenger to the superintendent and have charge of the furnace and lights at the office and residence buildings, and of the barns.	
J. H. Demby, manager free bath house	1,020
Duties are to have general charge of the free bath house, receive applications for free baths, collect tickets, and see that the rules and regulations are carried out, together with such instructions as he may from time to time receive from the superintendent.	
C. C. Cooper, head male attendant at free bath house	780
Duties are to have charge of bath tubs, pools, dressing rooms, etc., and see that the same are kept in a cleanly condition; also, to have charge of heating plant, electric motor, and pump which furnishes water supply, and to act as manager during the absence of the latter.	
Martin Winn, male attendant at free bath house	480
Duties are to have charge of the white men's bathing department and to keep the tubs, pools, and dressing rooms in a cleanly and sanitary condition.	
Samuel Clark, male attendant at free bath house	480
Duties are to have charge of the colored men's bathing department and to keep the tubs, pools, and dressing rooms in a cleanly and sanitary condition.	
Mary Clark, female attendant at free bath house	420
Duties are to have charge of the white women's bathing department and to keep the tubs and dressing rooms in a cleanly and sanitary condition.	
Mattie Fielding, female attendant at free bath house	420
Duties are to have charge of the colored women's bathing department and to keep the tubs and dressing rooms in a cleanly and sanitary condition.	
Miles E. Davis, policeman	840
Duties are to have general supervision over all government property, see that no stock or persons commit depredations on the reservation, observe and report all violations of department rules and regulations, give general information to strangers concerning the reservation, make arrests when necessity requires, and alternate the night and day watch with the other policemen.	
George Burrough, policeman	840
Duties same as other policemen.	
Montgomery Prichard, mounted policeman for night duty	960
Jonathan A. Jordan, supervisor on the reservation	900
Duties are to have charge of the distribution of the hot water and see that each bath house gets the amount allotted to it, and act as foreman of foresters and gardeners.	
Patrick J. Dugan, laborer[a]	540
Peter Nelson, laborer[a]	540
William F. Jennings, laborer[a]	540
Thomas George, laborer[a]	540
Philander H. Bump, laborer[a]	540
Bishop H. Burrough, laborer[a]	540
Robert L. Stutts, laborer[a]	540
John Ussery, laborer[a]	540

[a] Duties of laborers are to cultivate and care for shrubbery and flowers, keep up roads, drives, and walks, and make and maintain other improvements on the reservation under direction of the superintendent.

Since 1879 the free bath house has been maintained by the Government, as provided by law, upon which numerous improvements have been made from time to time. During the past year a new cement cooling tank, with a capacity of 14,600 gallons, was installed, a system of shower baths placed in two of the new pools in the men's department, and other minor improvements made. The demand for accommodations for the indigent at this bath house is steadily increasing, and a more modern building, with more up-to-date bathing arrangements, will have to be supplied in the near future. Other principal improvements on the reservation, such as repairs to roads and retaining walls, etc., have cost approximately $1,000.

The following is the record of the free bath house during the year:

Baths given by free bath house.

Applications for free baths	7,915
Applications for free baths refused	175
Tickets issued on original application	7,740
Tickets reissued on original application	4,836
Baths given to white males	120,544
Baths given to white females	26,884
Baths given to colored males	55,175
Baths given to colored females	22,850
Total baths given during the year	225,453
Average number of persons bathed daily	623
Honorably discharged soldiers and sailors bathed	891

The baths given by the various bath houses and the government free bath house during the year were as follows:

Total number of baths given.

Paid baths	682,360
Complimentary baths	14,414
Baths at free bath house	225,453
Grand total	922,257

There are 25 bath houses receiving hot water under lease with the department, of which 11 are on the permanent reservation and 14 on private property. These bath houses have been constructed by their respective owners according to their varying circumstances and ideas, and there is no uniformity, either of architectural design or quality of equipment. The department has accordingly prescribed a varying schedule of rates to be charged for baths by the different bath houses, the rate in each case being based upon the quality of equipments, accommodations, and service furnished by the house. Readjustments of these rates are made from time to time as circumstances warrant.

Table of maximum rates for single baths and course of 21 baths, approved January 27, 1909.

Name of bath house.	Single bath.	Twenty-one baths.	Name of bath house.	Single bath.	Twenty-one baths.
Arlington	$0.50	$10.00	Ozark	$0.25	$4.00
Alhambra	.30	5.00	Ozark Sanitorium	.35	6.00
Majestic	.40	7.00	Park	.50	10.00
Eastman	.50	10.00	Palace	.40	7.00
Great Northern	.40	7.00	Rockafellow	.35	6.00
Hale	.40	7.00	Rammelsberg	.20	3.00
Horse Shoe	.25	4.00	Superior	.35	6.00
Hot Springs	.40	7.00	St. Joseph's Infirmary	.40	7.00
Imperial	.45	8.00	Waverly	.35	6.00
Lamar	.40	7.00	Moody	.40	7.00
Magnesia	.30	5.00	Crystal (colored)	.25	4.00
Maurice	.40	7.00	Rector	.40	7.00

The different individuals and corporations now holding leases for hot-water privileges from the government reservation, also ground leases, together with the date and expiration of said leases, are given in the following table:

Hot water and ground leases.

Name of bath house, etc.	Lessee.	Tubs.	Date of lease.	Expiration of lease.
Alhambra	Alhambra Bath House Co	24	Feb. 28, 1894	Feb. 27, 1914
Arlington	Arlington Hotel Co	32	Mar. 3, 1892	Mar. 2, 1912
Majestic	Avenue Hotel Co	20	Jan. 1, 1903	Dec. 31, 1912
Ozark Sanitorium	Ozark Sanitorium Co.[a]	4	Sept. 16, 1905	Sept. 15, 1907
Eastman	New York Hotel Co	40	Nov. 26, 1892	May 11, 1912
Great Northern	Fannie G. Williamson	17	May 25, 1897	May 14, 1912
Hale	Roots & Eastman[a]	26	Jan. 1, 1893	Dec. 31, 1907
Horse Shoe	D. Fellows Platt	30	Jan. 1, 1895	Dec. 31, 1909
Hot Springs	C. H. V. and G. M. Smith	16	Jan. 1, 1903	Dec. 31, 1912
Imperial	Chas. N. Rix and Mary E. Barns[a]	25	Jan. 1, 1902	Dec. 31, 1906
Lamar	M. C. Tombler and G. H. Buckstaff	30	Jan. 1, 1897	Dec. 31, 1916
Magnesia	Chas. B. Platt	30	Jan. 1, 1895	Dec. 31, 1909
Maurice	Maurice, Convers & Maurice	24	Jan. 1, 1897	Dec. 31, 1916
Ozark	F. P. Sorrells and F. B. Latta	26	Jan. 1, 1904	Dec. 31, 1913
Palace	Samuel W. Fordyce	23	Jan. 1, 1907	Dec. 31, 1921
Park	Park Hotel Co	40	May 12, 1892	May 11, 1912
Rector	Elias W. Rector	12	Apr. 16, 1904	Apr. 15, 1914
Rockafellow	Mahala J. Rockafellow	18	July 1, 1901	June 30, 1916
St. Joseph's Infirmary	Sister Scholastica	8	Feb. 1, 1904	Jan. 31, 1914
Superior	Robert Proctor and R. A. Simpson[a]	16	Sept. 15, 1896	Sept. 14, 1906
Waverly	New Waverly Hotel Co	20	Mar. 24, 1893	Mar. 23, 1913
Rammelsberg	Gilbert E. Hogaboom, Aaron H. and Milo R. Buckstaff, Sinclair Mainland.[a]	18	Dec. 31, 1906	Dec. 31, 1908
Moody	Nicholas M. Moody	12	July 1, 1900	June 30, 1910
Crystal	Colored Knights of Pythias	16	Aug. 1, 1903	July 31, 1913
Horse Pool	Simon Cooper	[b] 2	Jan. 7, 1908	Oct. 29, 1912
Eastman Hotel[c]	New York Hotel Co	[d] 24	May 12, 1892	May 11, 1912
Park Hotel[c]	Park Hotel Co	6	....do	Do.
Moody Hotel[c]	Nicholas M. Moody	2	July 1, 1900	June 30, 1910
Ozark Sanitorium[c]	Ozark Sanitorium Co.[a]	6	Sept. 16, 1905	Sept. 15, 1907
St. Joseph's Infirmary[c]	Sister Scholastica	2	Feb. 1, 1904	Jan. 31, 1914
Arlington Hotel[c]	Arlington Hotel Co	26	Mar. 3, 1892	Mar. 2, 1912
Ground lease		.....		
Ground lease	Hot Springs Mountain Observatory Co.	.....	Oct. 16, 1903	Aug. 31, 1913

[a] Tenants holding over.
[b] Water sufficient to supply two tubs.
[c] Water used in private bath rooms.
[d] Including extra water sufficient to supply one tub; authorized by department letter of January 13, 1891.

The total tubbage of the various houses, including installations in the Eastman, Arlington, Park, and Moody hotels, Ozark Sanitorium, and St. Joseph's Infirmary, under the act of April 12, 1904, was 595 on June 30, 1909. Reduced tubbage authorized from July 1 for the Hale bath house makes the present total 592 tubs.

Under date of January 21, 1909, Mr. Horatio N. Parker, assistant engineer of the Geological Survey, was detailed to make a careful and thorough examination of the bath-house buildings supplied with water from the Hot Springs Reservation, as well as their appurtenances. The investigation extended from January 26 to March 10, and a voluminous report covering the conditions at Hot Springs, with suggestions for the improvement of the bath-house buildings, etc., has been submitted by Mr. Parker, and a copy thereof furnished the superintendent of the reservation for consideration in connection with the renewing of expired leases.

During the year 1909 five additional bath houses have come within the operation of the increased tubbage rate fixed by the Secretary of the Interior in 1908, in pursuance of the authority vested in him by the act of March 3, 1891. The increase was from $30 to $60 per tub

per annum, and the new rate has become effective as to all but four bath houses; as to these the change can be made at the end of the current five-year periods of their leases in 1910 and 1911. The ground rent of the Arlington bath house was also increased in 1908 from $2,500 to $5,000. The department rules and regulations for the government of the reservation have been uniformly observed by the bath-house lessees, and the latter have likewise cooperated in steps looking to the betterment of conditions at Hot Springs.

The following table shows the amount of business done by each bath house during the year, the number of tickets sold, the number of baths given, and the total receipts after deducting the amount paid for tickets redeemed. The total net receipts amounted to $196,701.40.

Business of bath houses, fiscal year ended June 30, 1909.

Name of bath house.	Whole tickets.	Half tickets.	Quarter tickets.	Single paid baths.	Number of baths sold.
Arlington	1,138	924	.....	7,487	40,625
Eastman [a]	310	167	.....	1,093	9,273
Park [a]	720	442	.....	567	20,107
Alhambra	1,622	1,014	.....	2,383	46,585
Lamar	1,414	1,116	269	604	42,803
Magnesia	1,436	601	.....	536	36 703
Horse Shoe	1,459	1,237	.....	695	43,704
Hale	1,008	792	.....	2,646	31,734
Imperial	1,514	770	.....	1,003	40,497
Palace	1,532	655	.....	845	39,567
Ozark	3,128	1,767	493	1,484	87,007
Maurice	2,255	1,051	.....	342	58,207
Majestic	1,484	399	.....	759	35,913
Rockafellow	1,427	792	.....	783	38,670
Rammelsberg	1,556	917	523	2,273	46,734
Hot Springs	649	287	.....	603	17,102
Superior	891	362	44	856	23,407
St. Joseph's Infirmary	561	164	.....	265	13,686
Waverly	1,026	664	.....	625	28,811
Rector	548	360	.....	1,427	16,535
Ozark Sanatorium	192	13	.....	46	4,206
Great Northern	324	216	2	1,347	10,621
Moody	807	410	.....	865	21,912
Crystal	290	432	.....	911	11,321
Total	27,291	15,582	1,331	30,445	765,730

Name of bath house.	Number of baths redeemed.	Net paid baths.	Number of complimentaries.	Amount paid for redeemed baths.	Total receipts, less redemptions.
Arlington	4,036	36,589	502	$2,018.00	$17,725.50
Eastman [a]	1,282	7,991	69	641.00	3,840.50
Park [a]	2,655	17,452	78	1,054.20	6,538.80
Alhambra	5,414	41,171	984	1,353.50	9,892.25
Lamar	4,969	37,834	1,321	1,739.35	12,791.60
Magnesia	4,248	32,455	530	1,062.00	7,781.30
Horse Shoe	2,965	40,739	708	593.00	7,845.80
Hale	2,414	29,320	747	845.05	9,962.75
Imperial	3,223	37,274	523	1,128.15	12,518.60
Palace	5,235	34,332	775	1,559.05	9,771.90
Ozark	8,990	78,017	1,042	1,798.00	15,183.00
Maurice	8,352	49,855	406	2,923.45	16,780.05
Majestic	7,008	28,905	744	1,752.95	10,335.15
Rockafellow	2,536	36,134	103	760.90	10,451.15
Rammelsberg	5,048	41,686	877	757.20	6,131.60
Hot Springs	1,688	15,414	625	590.90	5,201.30
Superior	2,418	20,989	660	725.55	5,285.75
St. Joseph's Infirmary	335	13,351	1,084	100.60	4,117.20
Waverly	3,102	25,709	815	931.85	7,435.50
Rector	1,957	14,578	737	684.95	4,941.50
Ozark Sanatorium	764	3,442	112	229.25	976.70
Great Northern	1,443	9,178	587	505.15	2,634.70
Moody	2,651	19,261	188	928.00	6,516.70
Crystal	607	10,714	197	130.70	2,042.10
Total	83,340	682,390	14,414	24,812.75	196,701.40

[a] Open less than three months.

The efforts looking to the suppression of the system in vogue at Hot Springs known as "doctor drumming," which has wrought so much evil at the resort during the past, were continued during the year. In pursuance of the authority contained in the act of Congress approved April 20, 1904, the department on October 31, 1904, adopted regulations which were reissued February 1, 1908, providing, among other things, for the registry of physicians authorized to prescribe the baths and establishing a board of medical commissioners to pass upon the character and professional qualifications of physicians applying for registration thereunder. The act provided that no physician who engaged in the practice of drumming for patients should be registered, and made it a misdemeanor for any physician not duly authorized by the department to issue permits for persons to take the baths.

The regulations of the department provide that any case of violation of the provisions thereof on the part of the owners, managers, or employees of the bath houses receiving hot water from the reservation will result in the cutting off of the water for the bath house or the canceling of the lease, as the department may determine.

Physicians showing proper qualifications and character have been placed upon the register of those authorized to prescribe the waters from the hot springs; those physicians shown not to be professionally qualified, or to have been guilty of the practice of drumming, in violation of the regulations, have been denied registration. In a number of cases it has been necessary to strike from the list of registered physicians the names of those who were found, subsequent to their registration, to be engaged in drumming for patients. There were 9 added to the list during the year and 3 dropped. On November 1, 1909, there were 120 resident and 35 nonresident physicians on the registered list.

Copies of the rules and regulations for the government of bath houses receiving water from the reservation, as well as touching the management of the free bath house, are hereto appended.

Whittington Lake Reserve Park has been cared for, and considerable work of a minor character looking to its betterment has been done.

The arch constructed by the Government over Rock Creek and under Central avenue is in good condition, and such minor repairs thereto as were necessary have been made.

Under the act of June 21, 1894 (28 Stat., 95), lots 4, 5, and 6, block 115, in the city of Hot Springs, were designated by the department for occupancy by the Barry Hospital, "for the use and benefit of the poor, and for no other purpose." The United States, however, reserved to itself the fee in the land, with the right to resume possession or otherwise dispose of the same.

By the sundry civil act approved March 3, 1901 (31 Stat., 1188), the Secretary of the Interior was directed to determine the value of certain condemned buildings formerly located on the Hot Springs Mountain Reservation, which buildings were condemned by the Hot Springs Commission and proof of value taken, but which were destroyed by fire on the night of March 5, 1877, before said commissioners had issued certificates for the value thereof, as they were authorized and directed to do, and did afterwards do for buildings

similarly situated but not burned. A sum of money sufficient to pay for such investigation, as well as for the claims so ascertained, was appropriated out of any money in the Treasury not otherwise appropriated, and the Secretary of the Interior was directed to pay the amount of the claims so found due and to report to Congress his action in the premises. Pursuant to the requirement of the statute, I have to report that 32 claims have been presented under the act, of which 19 have been allowed, aggregating in value $18,257.52; 2 have been rejected, and 11 are under consideration in the General Land Office under instructions from the department.

RULES AND REGULATIONS.

REGULATIONS OF FEBRUARY 1, 1908, FOR THE GOVERNMENT OF ALL BATH HOUSES RECEIVING HOT WATER FROM THE UNITED STATES RESERVATION AT HOT SPRINGS, ARK.

The superintendent of the Hot Springs Reservation is directed to enforce a prompt and faithful compliance with the following rules:

RULE 1. Bath houses or hotels will be allowed such number of tubs as the Secretary of the Interior may, in his discretion, deem proper and necessary for the public service and the amount of hot water will justify.

RULE 2. The constant flow of hot water for vapor or other baths, even during business hours, or the unnecessary waste of water in any manner, is strictly prohibited, and will, if continued after written notice from the superintendent to stop such waste of water, be considered by the department sufficient grounds for the cancellation of the lease of such offending lessee.

RULE 3. Rentals must be paid quarterly in advance, at the office of the superintendent, and if not paid within five days from the beginning of each quarter, the supply of water may be cut off.

RULE 4. The charge for baths at the different bath houses shall be at the rates fixed by the Secretary of the Interior, and no bath tickets shall be sold for more than said rate, and then only to such persons as intend to actually use them for bathing. No bath ticket shall be sold except at the office of the bath house where the bath is to be given, and tickets must show the date when issued, the serial number, the number of baths for which issued, the full name of the purchaser, and the amount paid therefor. Bath tickets shall be redeemable for the same proportionate price for which they were sold, when presented by the original purchaser: *Provided*, That when less than seven baths have been taken on any ticket presented for redemption, the bath house may charge the rate for single baths for the number of baths taken on said ticket. No bath ticket or part of a ticket shall be reissued after having been redeemed. The issue of complimentary bath tickets must not exceed 5 per cent of the number of tickets sold by the bath house during the last fiscal year. The renting and selling of bath robes, towels, soap, toilet articles, or articles of merchandise in bath houses is prohibited.

RULE 5. The owners or managers of bath houses receiving water from the Hot Springs Reservation, and the employees of any such bath house, are absolutely prohibited from either directly or indirectly reflecting on or questioning the integrity of the hot water supply of any other bath house, or of claiming superiority of its own supply of hot water over that furnished from the springs on the reservation to other bath houses. Upon evidence of violation of this rule, the superintendent shall report the facts, with his rec-

ommendation, to the Secretary of the Interior, looking to the shutting off of the water from any bath house or canceling the lease, as the department may determine.

RULE 6. Bath-house attendants shall be allowed to charge for their services not exceeding 15 cents for a single bath, $1 per week, or $3 per course of 21 baths, to be collected for the attendant by the bath-house manager and properly accounted for by him to the attendant. The services of the attendants shall include all the necessities of the bath, except towels and bath robes, laundering bath robes, rubbing mercury, and handling helpless invalids. They shall be required to keep themselves in a neat and cleanly condition, both in person and in dress, and may be required to make good any damage accruing from breakage or neglect of duty. It shall be optional with the bather whether he employ an attendant or not. No person shall be employed or permitted to serve or occupy space in any bath house as a mercury rubber, or as a masseur, without the approval of the superintendent first had and obtained; and every person so employed or serving shall be subject and amenable to the rules and regulations the same as attendants and other bath-house employees.

RULE 7. The payment of any sum of money, or anything of value, either directly or indirectly, by any bath-house owner, manager, clerk, or attendant as compensation for drumming customers to any bath house, or allowing public drummers, drumming doctors, hotel or boarding-house proprietors who are drummers, or persons who work with them as inside men, to bring persons or show them through, or to loiter in or about any bath house, is positively forbidden. Upon evidence of violation of this rule, the superintendent shall report the facts, with his recommendations, to the Secretary of the Interior, looking to the shutting off of the water from any bath house or canceling the lease, as the department may determine.

RULE 8. The lessee of each bath house shall cause to be kept a full and correct register of each bath given, the number and kind of bath tickets sold, and the number of complimentary tickets issued each day. No person shall be allowed to bathe without a numbered ticket being issued, and a record of the same being kept and duly reported to the superintendent on the first day of each month as paid, complimentary, or free baths, together with any information he may have showing a violation of the bath-house rules and regulations which may be susceptible of proof.

RULE 9. All bath houses receiving deposits of jewelry, money, or other valuables from bathers must provide means satisfactory to the superintendent of the reservation for the safe-keeping thereof; it is to be understood, however, that the Government assumes no responsibility in the premises. All losses must be promptly reported to the superintendent by the bath-house manager.

RULE 10. An applicant for baths who is under medical treatment shall not be permitted to bathe in any bath house supplied with water from the Hot Springs Reservation, unless said applicant presents satisfactory evidence that he or she is the patient of a physician who is duly registered at the office of the superintendent as qualified to prescribe the waters of the hot springs, and who is known not to engage in drumming for custom. The violation of this rule by the

owner, manager, or any employee of a bath house receiving hot water from the reservation will result in the cutting off of the water from the bath house or the canceling of the lease, as the department may determine.

RULE 11. Physicians desiring to prescribe the waters of the Hot Springs, either internally or through the medium of the baths, must first be registered at the office of the superintendent of the reservation. Registration will be accorded only to such physicians as are found, by a board designated by the Secretary of the Interior, to have proper professional qualifications and character, and who do not engage in drumming for custom. No physician who shall engage in the solicitation of patronage through the medium of drummers or otherwise shall be or remain registered. In case any person who, in violation of these regulations, bathes or attempts to bathe, or enters or attempts to enter upon the Hot Springs Reservation to bathe, shall have the permit of a physician therefor, such physician shall be liable to the penalties provided in the act of April 20, 1904, unless he is regularly registered, but the bather or the person attempting to bathe shall not be liable to the penalties of said act, unless it shall be made to appear that he knew or had reason to believe that the physician giving him the permit to bathe was not regularly registered.

RULE 12. Persons violating any of the foregoing regulations within the purview of the act of April 20, 1904, entitled "An act conferring jurisdiction upon United States commissioners over offenses committed in a portion of the permanent Hot Springs Mountain Reservation, Arkansas," and the act of March 2, 1907, amendatory thereof, will be deemed guilty of a misdemeanor, and be subjected on conviction to the payment of a fine, as provided in said act of April 20, 1904, of not exceeding $100, and be adjudged to pay all costs of the proceeding.

RULE 13. All bath houses shall be kept in a neat, cleanly, and sanitary condition, and all sewage and waste water properly conducted away, and all underdrainage kept in perfect order. The water-closets shall have sufficient and free connection with the public sewers and be kept in the best order and with the best plumbing furnishings and appliances. Lessees of bath houses on the permanent reservation shall, under the direction of the superintendent, cultivate and maintain a part of the bath-house park in front of their respective bath houses, the space for each to cultivate to be allotted by the superintendent.

RULE 14. Each bath-house manager, clerk, and attendant shall be required to have a full and complete understanding of the bath-house rules and regulations before entering upon his duties.

The superintendent is authorized to require the discharge of any bath-house manager, clerk, attendant, mercury rubber, or masseur for bath-house drumming or refusing or neglecting to carry out the bath-house rules and regulations according to the true intent and meaning thereof. Any person discharged for cause from a bath house, or removed at the request of the superintendent, shall not be again employed by the same or any other bath house, or permitted to render service in any bath house, without the written consent of the superintendent. Managers must promptly report to the superintendent the name of any person so removed.

A neatly framed copy of the rules and regulations now in force, together with the prices of baths and attendants' fees, both separately and combined, printed in large black type on white cardboard, shall be conspicuously posted in the office of each bath house.

REGULATIONS OF JULY 7, 1900, FOR THE GOVERNMENT OF THE FREE BATH HOUSE.

These baths are provided and maintained by the United States pursuant to the requirements of the act of Congress approved December 16, 1878 (20 Stat., 258), for the use of the indigent only; neither the manager nor attendants are authorized to supply them to others.

The manager of the free bath house is required to enforce a strict observance of the following rules and regulations:

RULE 1. No baths will be supplied except on written applications made on blanks furnished at the office of the bath house, making full answers to the questions therein propounded, then if the applicant is found to be indigent (in accordance with the common acceptation of the word), the manager will issue a ticket good for 21 baths, which may be reissued on the same application if necessary.

RULE 2. Persons using the free baths are required to maintain quiet and orderly deportment while in or about the bath house, to abstain from the use of tobacco, either by chewing or smoking, while in the pool rooms, dressing rooms, or office, not to scatter rags or paper on the floor, or to loiter in or about the building after bathing.

RULE 3. The wanton exposure of person or entering any of the front rooms in a nude state, the use of loud, vulgar, or profane language, the use of rags, paper, soap, or any foreign substance in the pool rooms is positively prohibited.

RULE 4. Persons using these baths are not allowed to stand or sit on or in any way interfere with the water pipes or valves or to stand on the chairs or benches. All persons entering the house are required to clean their feet at the door and avoid as much as possible bringing dirt or mud on the floors. Boys over 5 years of age will not be allowed in the female department during bathing hours.

RULE 5. Any willful or repeated violation of these rules, or any disorderly or contemptuous conduct, will subject the persons so offending to suspension or expulsion, at the discretion of the superintendent of the reservation.

RULE 6. Neither the manager nor the government attendants shall be allowed to receive or become responsible for any valuables or to charge any fees for any service rendered to bathers which comes within the direct line of their duty.

RULE 7. The manager is required to enforce all the foregoing rules and to maintain good order in and about the bath house, to see that all indigent persons applying are supplied with baths, and to make a written report to the superintendent each month on blank forms supplied for that purpose. He may reject any application for free baths if he has reason to believe the applicant has made false answers in his written application, and the aggrieved may appeal to the superintendent of the reservation.

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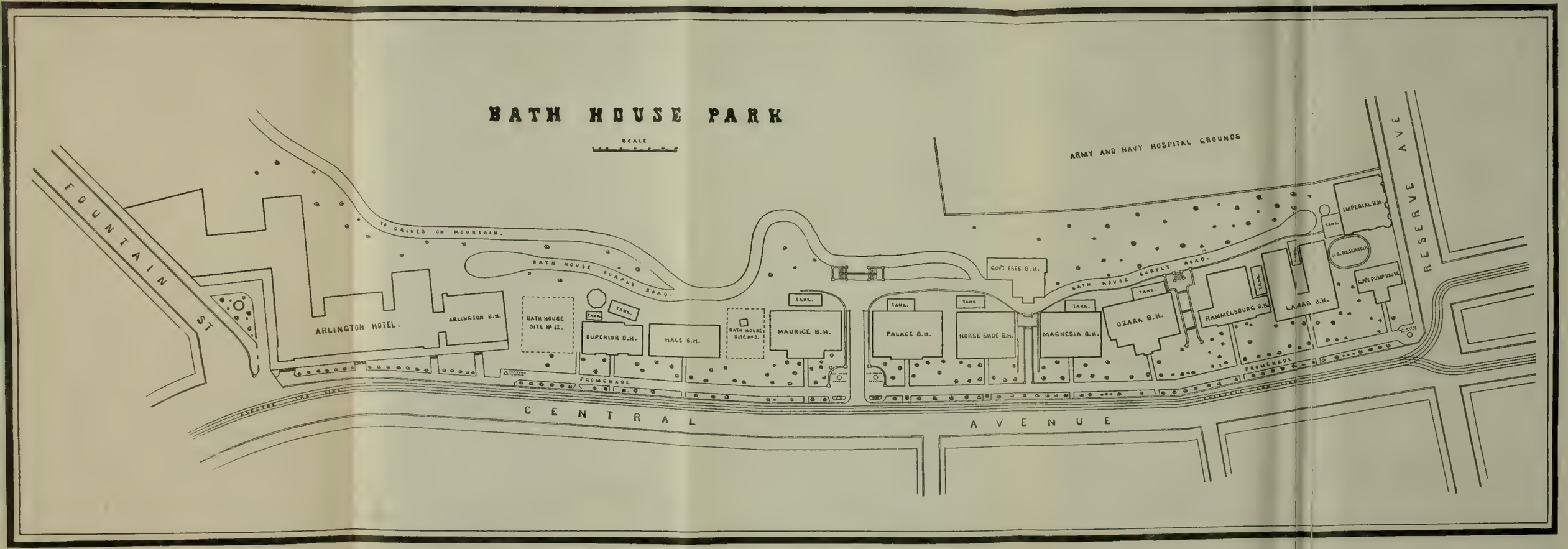
BATH HOUSE PARK
SCALE
FOUNTAIN ST
TO DRIVES ON MOUNTAIN.
BATH HOUSE SUPPLY ROAD.
ARLINGTON HOTEL.
ARLINGTON B.H.
BATH HOUSE SITE No 12.
TANK.
SUPERIOR B.H.
HALE B.H.
BATH HOUSE SITE No 3.
MAURICE B.H.
ARMY AND NAVY HOSPITAL GROUNDS
GOV'T FREE B.H.
PALACE B.H.
HORSE SHOE B.H.
MAGNESIA B.H.
OZARK B.H.
RAMMELSBURG B.H.
LAMAR B.H.
IMPERIAL B.H.
U.S. RESERVOIR
GOV'T PUMP HOUSE
RESERVE AVE
PROMENADE
ELECTRIC CAR TRACK
CENTRAL AVENUE